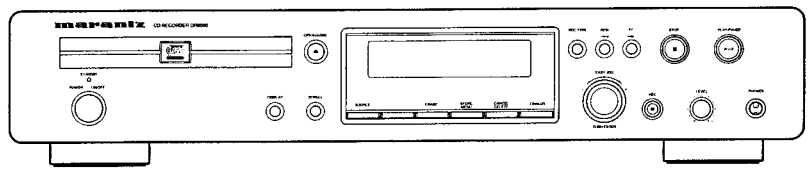
Service Manual

DR6000 /F1N, /K1G, /N1G /K1B, /N1B, /U1B

Compact Disc Recorder



REMARK : This service manual explains them by extracting specifications designed for the model DR6000 only. The explanation for CD-R module "MAR770" (Loader : CDL4009' + CD-R Main board) is not mentioned on this service manual.
The CD-R module information is described in the service manual of CD-R modules <MAR770/MAR775>.

TABLE OF CONTENTS

SECTION	PAGE
MAIN UNIT	
1. Servicing the DR6000	1
2. TECHNICAL SPECIFICATIONS	3
3. WARNINGS	4
4. SERVICE HINTS AND TOOLS	5
5. SIAGNOSTIC SOFTWARE	6
6. FAULTFINDING TREES	11
7. FAULTFINDING GUIDE	15
8. WIRING DIAGRAM	25
9. BLOCK DIAGRAM	27
10. SCHEMATIC DIAGRAM AND PARTS LOCATION	29
11. EXPLODED VIEW AND PARTS LIST	37
12. ELECTRICAL PARTS LIST	40

Please use this service manual with referring to the user guide (D.F.U.) without fail.
修理の際は、必ず取扱説明書を準備し操作方法を確認の上作業を行ってください。

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DR6000

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3. Description of parts
4. Model number for which part is required
5. Way of shipment
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SHOCK, FIRE HAZARD SERVICE TEST :

CAUTION : After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or Front Panel of product and controls and chassis bottom.

Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before it is return to the user/customer.

Ref. UL Standard No. 1492.

In case of difficulties, do not hesitate to contact the Technical Department at above mentioned address.

1.Servicing the DR6000

1.1 INTRODUCTION:

The DR6000 is the consumer version of a CD recorder, this means that the SCMS (Serial Copy Management System) is included. The DR6000 can only record on the Audio CDRs (Consumer Use).
The DR6000 is suitable for recording and playback of CD-RW discs (CD-Re Writable disc).

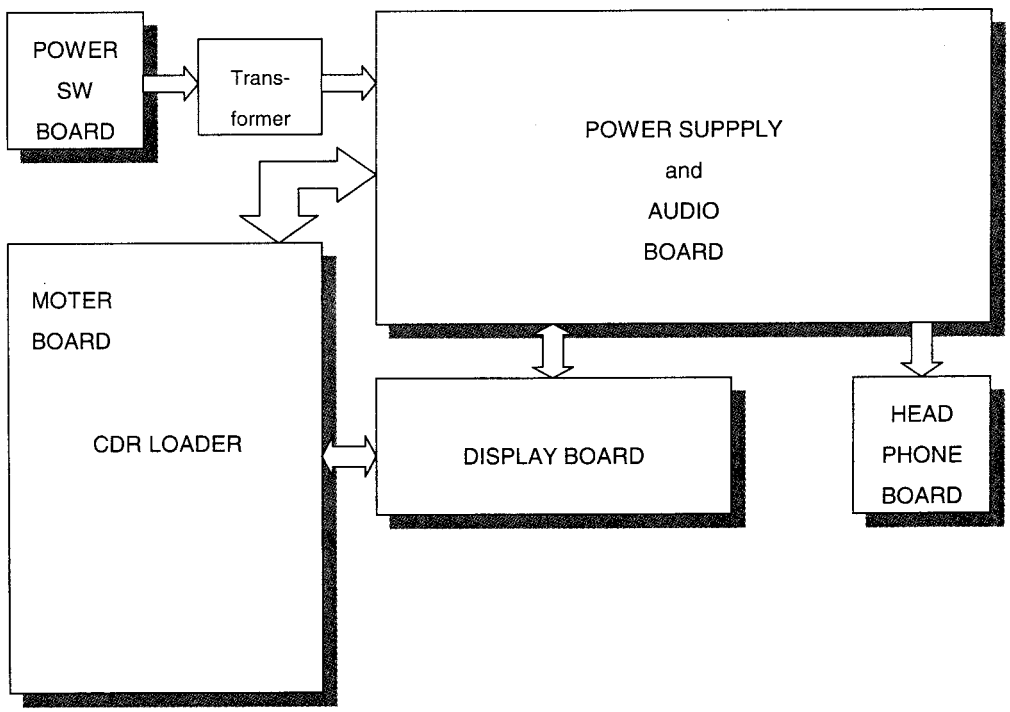
Playback & Recording and Disc

Disc / Player/Recorder	CD	CDR				CD-RW				SCMS
		Consumer Disc		Professional Disc		Consumer Disc		Professional Disc		
		Finalized	non Finalized	Finalized	non Finalized	Finalized	non Finalized	Finalized	non Finalized	
Audio CD Player Current products Ex:CD-17	P	P	no	P	no	no	no	no	no	-
Audio CD Player CD-RW playback Ex:CD-17MK II	P	P	no	P	no	P	no	P	no	-
CD-RW Recorder For Professional Ex:CDR630/640	P	P	P/R	P	P/R	P/R	P/R	P/R	P/R	no
CD-RW Recorder For Consumer Ex:DR6000	P	P	P/R	P	no	P/R	P/R	no	no	YES

Consumer : For Digital Audio
Professional : For General use (Including PC)
P : Playback
R : Recording

1.2 OPENING THE PRODUCT:

The product can be opened by removing the top cover (6 screws). Once the product is opened one can have access to the several PCB's and the main module. To have access to the Display PCB, the Headphone PCB first the front cover has to be removed (See dismantling instructions on page1-7).



Below the several PCB's and it function and service policy will be discussed:

1.2.1 CDR loader (CDR main module CDL4009 or MAR770):

This complete CDR loader is considered as not repairable in the field. therefore this module will be repaired centrally. A module exchange procedure will be set up for this purpose. The module can be removed from the product by removing 4 screws and the transformer (see demounting the CDR module on page 1-7), and loosing the connectors.

This module is the complete CD recorder, it contains the following parts:

CD Mechanism (CDM4009'). Underneath this mechanism a PCB is mounted which is adjusted to the mechanism (laser current settings are stored in EEPROM).

Loader Assy. This mechanical assy takes care for the tray control.

Main PCB. This PCB takes care that the (analog or digital) signal to be recorded is converted into a suitable signal which can be recorded on the disc.

Digital signals with an other sampling frequency then 44.1kHz will be converted in the sample rate converter (DASP) to 44.1kHz.

Analog signals will be first converted into a digital converter by the AD converter.

This PCB also takes care that the signal from the CD (playback) is converted into a suitable digital signal (or analog via the DA converter).

The main microprocessor controls the several functions of this PCB.

1.2.2 Power SW Board.

This PCB contains the Power SW, which is jointed the Power bottom on the front panel. All parts are available as spare parts.

1.2.3 Power Supply and Audio Board.

This PCB consists of power supply part and audio part. The power suppluy part delivers the several voltages for the diffrent PCB in the DR6000. On this power supply sevel fuses (secondary side) are mounted on this PCB. The audio part takes care that the signal from CDR main module is converted into an analog signal via DA converter and outputs the analog signal. This PCB contains the output and input connectors also. All parts are available as spare parts.

1.2.4 Display Board.

This PCB contains the Display, which informs the user about the status of the recording/playback process and it also takes care for scanning the keys on the front panel. The information from the keys is fed via a I^2C connection to the main microprocessor on the CDR loader module. Information which needs to be displayed is also fed via this I^2C line from the main microprocessor on the CDR loader module to the display controller.
The parts for this PCB are available as service parts so this PCB can be repairable up to component level.

1.2.5 Headphone Board.

This PCB contains the headphone socket and potentiometer which controls the headphone volume. All parts are available as spare parts.

IMPORTANT

In case of replace the CD-R module "MAR770", the initialization is necessary.
Please initialize the CD-R module with following orders.

1. Press the POWER button (POWER ON) while depressing FINALIZE button and REC TYPE button together.
2. FL Display shows;
   WAIT → PGM PROTOCOL → PGM PORT END
3. Press the POWER button (POWER OFF).

Then the CD-R module set up to DR6000 own status.

2 TECHNICAL SPECIFICATIONS

GENERAL

System ..... Compact disc digital audio
Number of channels ..... 2 (stereo)
Applicable discs ..... CD, CD-R (digital audio), CD-RW (digital audio)
Power Requirement
F version ..... AC 100 V 50 / 60 Hz
K version ..... AC 110 V / 220 V 50 /60 Hz
N version ..... AC 230 V 50 Hz
U version. ..... AC 120 V 60 Hz
Power Consumption ..... 24 W
Operating Temperature ..... 5 °C - 35 °C
Dimension (MAX)
Width ..... 440 mm
Height ..... 87 mm
Depth ..... 317 mm
Weight ..... 4.6 kg

AUDIO

Frequency Response ..... 20 Hz - 20 kHz
Playback S/N ..... 105 dB
Playback Dynamic Range ..... 96 dB
Playback Total Harmonic Distortion ..... 90 dB
Recording S/N (analog) ..... 90 dB
Recording Dynamic Range (analog) ..... 92 dB
Recording Total Harmonic Distortion (analog) ..... 84 dB
Analog Output Voltage ..... 2 Vrms
Digital Coaxial Output ..... 0.5 V (p-p) / 75 ohms
Digital Optical Output ..... - 20 dB
Headphones ..... 0 - 5 Vrms / 8 - 2000 ohms
Recording values for line input
Digital Coaxial Input (automatic sample rate conversion) ..... 32 - 48 kHz
Digital Optical Input (automatic sample rate conversion) ..... 32 - 48 kHz
Analog Input ..... 560 mVrms / 50 kohms

Specifications subject to change without prior notice.

3. WARNINGS

(GB) WARNING
All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wristband with resistance. Keep components and tools at this potential.

(F) ATTENTION
Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévite pourrait être considérablement écourtée par le fait qu'aucune précaution nést prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfileer le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

ESD

(D) WARNUNG
Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(NL) WAARSCHUWING
Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen vermindern. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(I) AVVERTIMENTO
Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparationi occorre quindi essere collegato allo stesso potenziale che quello della massa delápparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB) **AVAILABLE ESD PROTECTION EQUIPMENT :**

anti-static table mat	large	1200x650x1.25mm	4822 466 10953
	small	600x650x1.25mm	4822 466 10958
anti-static wristband			4822 395 10223
connection box (3 press stud connections, 1M)			4822 320 11307
extendible cable (2m, 2M , to connect wristband to connection box)			4822 320 11305
connecting cable (3m, 2M , to connect table mat to connection box)			4822 320 11306
earth cable (1M , to connect any product to mat or to connection box)			4822 320 11308
KIT ESD3 (combining all 6 prior products - small table mat)			4822 310 10671
wristband tester			4822 344 13999

SAFETY

(GB)
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.
Safety components are marked by the symbol ⚠

(F)
Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.
Les composants de sécurité sont marqués ⚠

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

(NL)
Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.
De Veiligheidsonderdelen zijn aangeduid met het symbool ⚠

(I)
Le norme di sicurezza estigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

(GB) **DANGER**: Invisible laser radiation when open.
AVOID DIRECT EXPOSURE TO BEAM.

CLASS 1
LASER PRODUCT

(S) Varning !
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

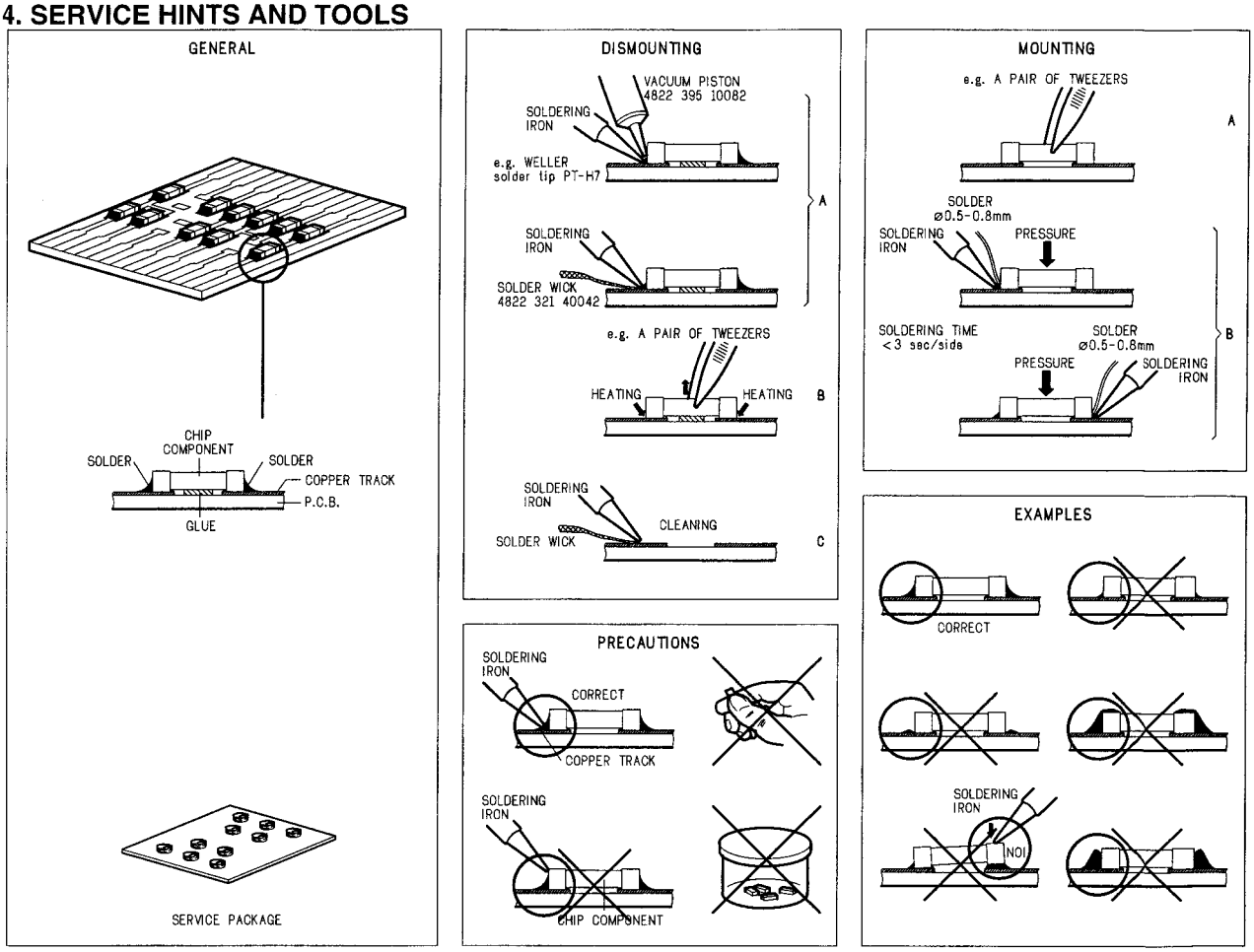
(DK) Advarsel !
Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

(SF) Varoitus !
Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

(GB)
After servicing and before returning the set to customer perform a leakage current measurement test from all exposed metal parts to earth ground, to assure no shock hazard exists.
The leakage current must not exceed 0.5mA.

(F)
"Pour votre sécurite, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

4. SERVICE HINTS AND TOOLS



SERVICE TOOLS

Audio signals disc	4822 397 30184
Disc without errors (SBC444)+	
Disc with DO errors, black spots and fingerprints (SBC444A)	4822 397 30245
Disc (65 min 1kHz) without no pause	4822 397 30155
Max. diameter disc (58.0 mm)	4822 397 60141
Torx screwdrivers	
Set (straight)	4822 395 50145
Set (square)	4822 395 50132
13th order filter	4822 395 30204
Hexagon socket screw button (No. 1.5)	

5. Diagnostic Software

5.1 Dealer mode

The purpose of the dealer mode is to prevent people taking out the CD inside the player at exhibitions, showrooms etc.. This mode disables the open/close function of the player.
The dealer mode can be switched on and off pressing keys [OPEN/CLOSE] and [STOP] of the CDR player simultaneously while switching on the unit. The dealer mode is stored in the flash memory and can only be changed by executing the above actions.

5.2 Dealer diagnostics

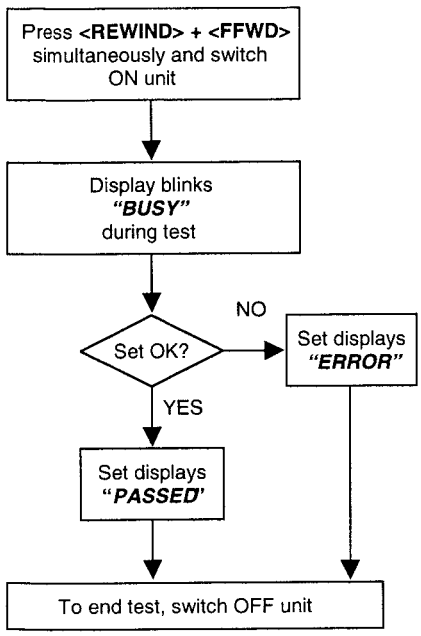


Figure 5-1

5.2.1 Description

The intention of the dealer diagnostics is to give an indication of the CDR player status. An inexperienced, even non-technical dealer will/can perform the test. Tests are executed automatically without need for external tools or disassembly of the unit. This test checks the CDR main board using the same tests as the electrical service diagnostics program. Only the result of the test, "PASSED" or "ERROR", will be shown on the display. Pressing keys [F FWD] and [REWIND] simultaneously while switching on the unit, starts the test. Switching off the unit ends the test.

5.2.2 Requirements to perform the test

- Working keyboard to start up the test.
- Working local display to check the output messages.

5.3 Electrical service diagnostics

ELECTRICAL SERVICE DIAGNOSTICS
(software versions, test for defective components)

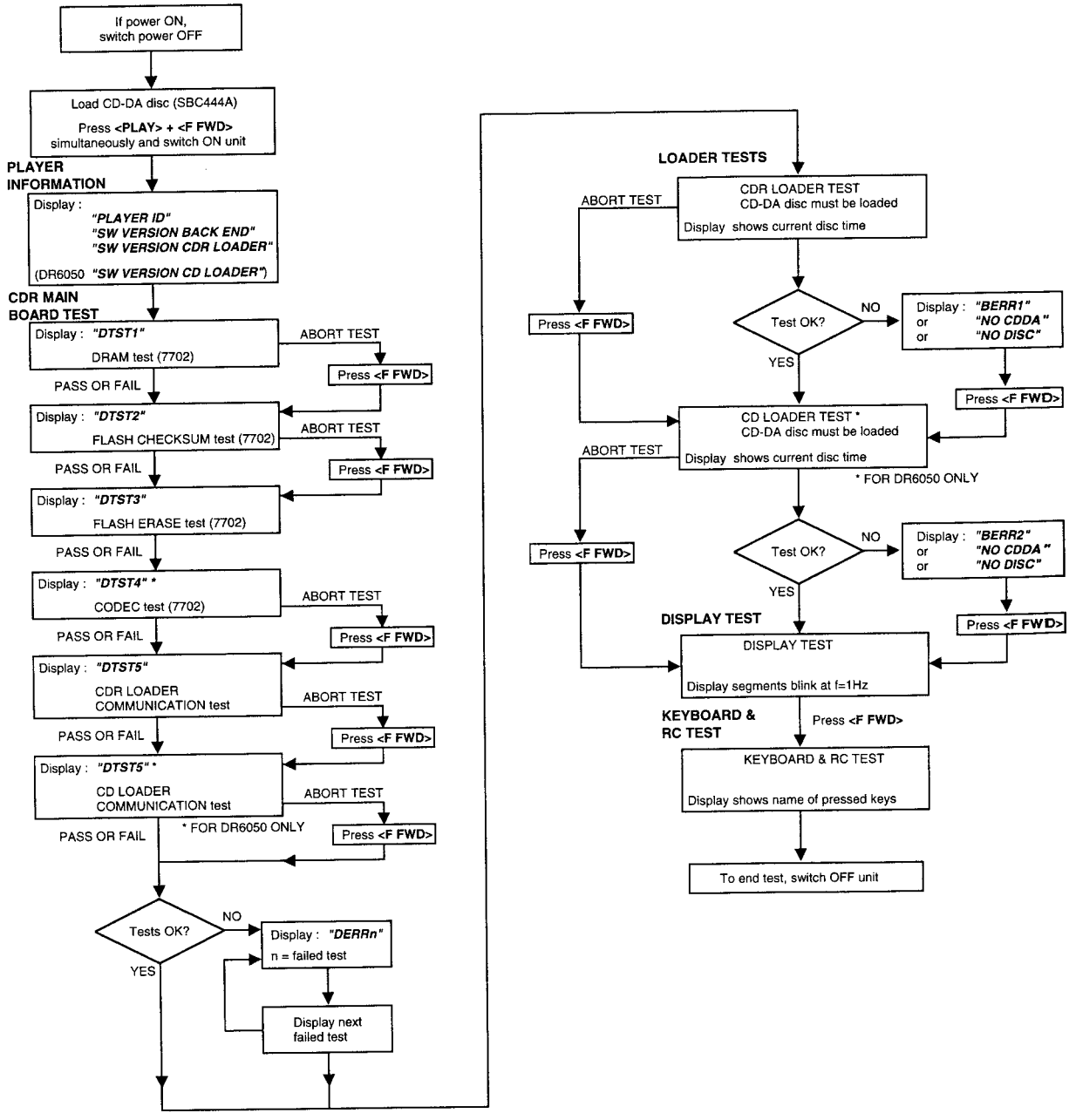

If power ON, switch power OFF
Load CD-DA disc (SBC444A)
Press <PLAY> + <F FWD> simultaneously and switch ON unit
PLAYER INFORMATION
Display : "PLAYER ID" "SW VERSION BACK END" "SW VERSION CDR LOADER" (DR6050 "SW VERSION CD LOADER")
CDR MAIN BOARD TEST
Display : "DTST1" DRAM test (7702)
ABORT TEST
Press <F FWD>
PASS OR FAIL
Display : "DTST2" FLASH CHECKSUM test (7702)
Display : "DTST3" FLASH ERASE test (7702)
Display : "DTST4" * CODEC test (7702)
Display : "DTST5" CDR LOADER COMMUNICATION test
Display : "DTST5" * CD LOADER COMMUNICATION test
* FOR DR6050 ONLY
Tests OK?
NO
YES
Display : "DERRn" n = failed test
Display next failed test
LOADER TESTS
CDR LOADER TEST
CD-DA disc must be loaded
Display shows current disc time
Test OK?
Display : "BERR1" or "NO CDDA" or "NO DISC"
CD LOADER TEST *
CD-DA disc must be loaded
Display shows current disc time
* FOR DR6050 ONLY
Display : "BERR2" or "NO CDDA" or "NO DISC"
DISPLAY TEST
DISPLAY TEST
Display segments blink at f=1Hz
KEYBOARD & RC TEST
Press <F FWD>
KEYBOARD & RC TEST
Display shows name of pressed keys
To end test, switch OFF unit

Figure 5-2

5.3.1 Description

The intention of the electrical service diagnostics is to show the software versions present in the player and to direct the dealer towards defective internal units. The units are : the CDR main board, the CDR loader, the CD loader in case of a DR6050 and the keyboard/display board. A sequence of tests is executed automatically. Some of the tests can be aborted or skipped without the result being taken into account. External tools or disassembly of the unit is not necessary to get the diagnostic information. Pressing keys [PLAY/PAUSE] and [F FWD] simultaneously while switching on the unit, starts the test. Switching off the unit ends the test.

5.3.2 Requirements to perform the test

- Working keyboard to start up the test.
- Working local display to check the output messages.
- A CD-DA disc with a minimum of 3 tracks in all trays to perform the disc test.

5.3.3 Description of the tests

Player information
In this part of the test the following important information can be checked without removing the cover :
- Recorder ID.
- SW-version back end of player.
- SW-version CDR loader.
- SW-version CD loader (only for DR6050).

CDR main board test
As soon as the CDR main board tests are finished, all failure messages (if any) will be displayed sequentially by pressing the [F FWD] key. The message "DERRn" will be displayed with n indicating the faulty test number.
If one of the tests is aborted with the [F FWD] key, no error message will be displayed for this test. The flash data erase test ("DTST3") can not be aborted !
The CDR main board test consists out of :

DRAM test
Display : "DTST1". The DRAM used for buffer management is tested by writing, reading and verifying test patterns.

Flash checksum test
Display : "DTST2". This test checks the checksum of the player's SW stored in the flash.

Flash data erase
Display : "DTST3". During this test, all temporary information (CDtxt) in the flash is erased.

CODEC (ADC/DAC) test
Display : "DTST4". This test checks the CODEC IC by writing, reading and verifying test patterns. The test is not applicable for CDR950.

CDR communication test
Display : "DTST5". The communication between the host processor (DASP) and the CDR loader via the DSA-R-bus is tested.

CD communication test
Display : "DTST6"). The communication between the host processor (DASP) and the CD loader is tested. The test is only applicable for DR6050.

Loader tests
These tests determine if the CDR loader and the CD loader in case of a DR6050 work correctly. A CD-DA disc with a minimum of 3 tracks needs to be inserted in both loaders. A disc test is executed to check focus control, disc motor control, radial control and jump grooves control. The disc test is performed by audio play-back of 5 seconds at the beginning, middle and end of the disc.

CDR loader test
During the test, the current disc time is shown. In case of an error the message "BERR1" will be displayed and the [F FWD] key must be pressed to continue with the following test. Pressing the [F FWD] key also aborts this test.

CD loader test
For CDR775 only. During the test, the current disc time is shown. In case of an error the message "BERR2" will be displayed and the [F FWD] key must be pressed to continue with the following test. Pressing the [F FWD] key also aborts this test.

Display test
All segments will blink at a frequency of 1 Hz. Pressing the [F FWD] key will start the next test because the user has to check for himself if all segments work properly.

Keyboard and remote control tests
The test will give the user the ability to test every key without executing the function assigned to it. Therefore, the user needs to press every key on the keyboard and the remote control. The display will show the name of the key being pressed. Pressing more than one key at once will give an unpredictable result except for the service combinations : [PLAY/PAUSE] + [STOP], [PLAY/PAUSE] + [F FWD], [F FWD] + [REWIND], [ERASE] + [RECORD], [PLAY/PAUSE] + [RECORD].

5.4 Mechanical service diagnostics

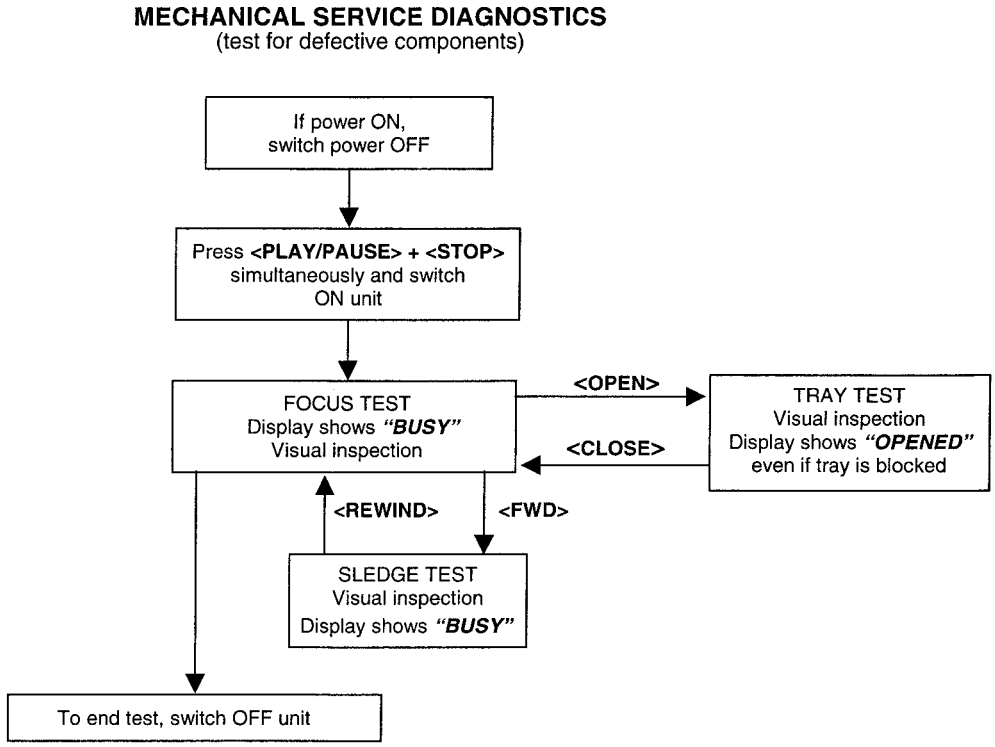


Figure 5-3

5.4.1 Description

No external tools are required to perform this test. The cover needs to be removed because the user has to check the movements of the tray, focus and sledge visually. Pressing keys [PLAY/PAUSE] and [STOP] simultaneously while switching on the unit, starts the test. Switching off the unit ends the test. In case of a DR6050, one can check the CD loader mechanics in the same way by pressing the above key combination on the CD player keys.

5.4.2 Requirements to perform the test

- Working keyboard to cycle through the tests and to start up the test.
- Working local display to check the output messages.

5.4.3 Description of the tests

Focus control test
The focussing lens is continuously moving up and down. The display reads "BUSY".

Sledge control test
After pressing [F FWD] the sledge continuously moves up and down. Pressing [REWIND] stops the sledge at the position it is in and the focus control test resumes. The display reads "BUSY".

Tray control test
This test starts from within the focus control test routine. Pressing [OPEN/CLOSE] moves the tray in or out. In the tray open position one can initiate focus and sledge tests by pressing [F FWD]. One has to stop these tests pressing [REWIND] before it is possible to close the tray again. Depending on the action the display reads "OPEN", "OPENED", "CLOSE" or "BUSY".

5.5 DC-erase service mode

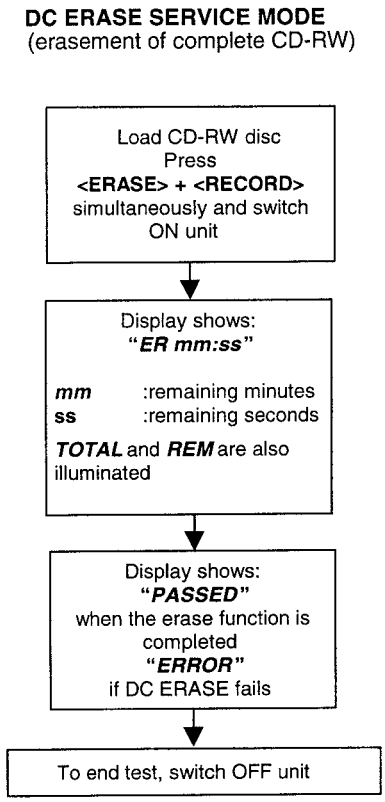


Figure 5-4

5.5.1 Description

This test is initiated by pressing [ERASE] and [RECORD] simultaneously while switching on the unit. The player will erase a complete CD-RW disc (including PMA and ATIP lead out area) at speed N=2. The display shows the countdown of the remaining time required for the operation to complete. The format is "ER mm:ss", where "mm" are the remaining minutes and "ss" the remaining seconds. After completion the message "PASSED" is shown, and the player has to be switched off and on again to start up in normal operating mode. Switching off the unit before completion of the test, leaves the disc in an unpredictable state. In such case only a complete DC-erase procedure can recover the CD-RW disc.

5.5.2 Requirements to perform the test

- Functional CDR player.
- A CD-RW audio disc must be present in the tray.

6. Faultfinding Trees

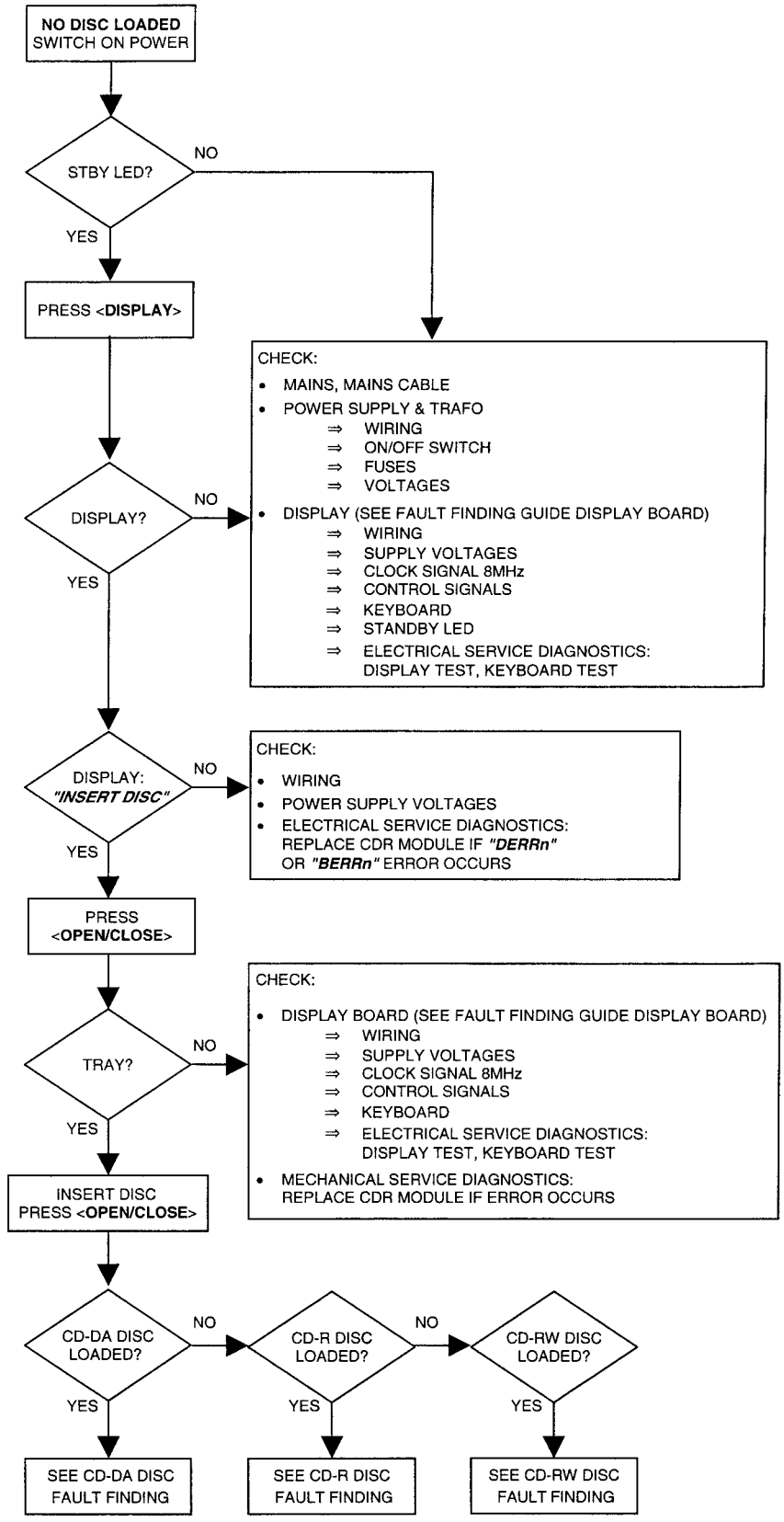


Figure 6-1

Faultfinding Trees

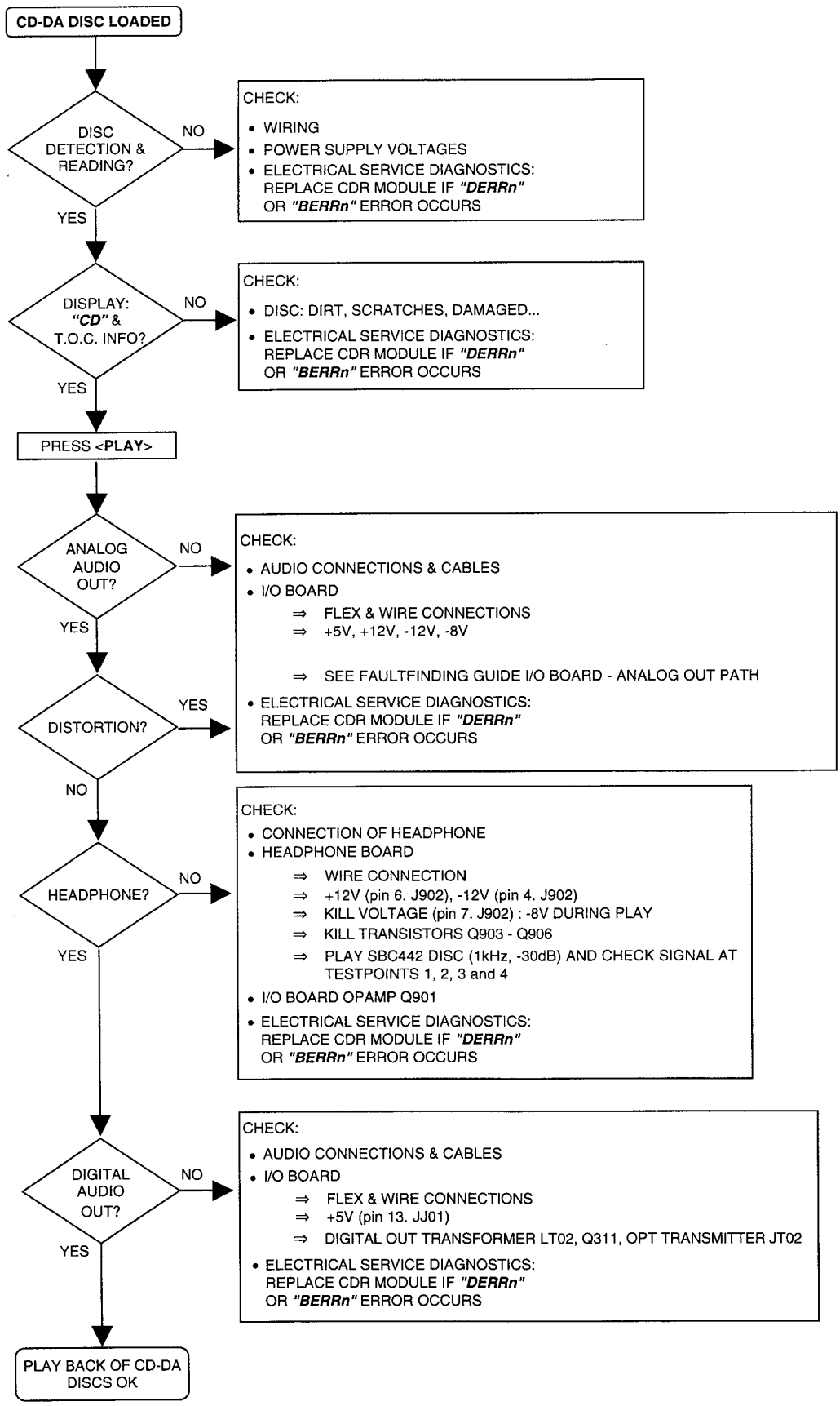

CD-DA DISC LOADED
DISC DETECTION & READING?
NO
CHECK:
• WIRING
• POWER SUPPLY VOLTAGES
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
DISPLAY: "CD" & T.O.C. INFO?
NO
CHECK:
• DISC: DIRT, SCRATCHES, DAMAGED...
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
PRESS <PLAY>
ANALOG AUDIO OUT?
NO
CHECK:
• AUDIO CONNECTIONS & CABLES
• I/O BOARD
⇒ FLEX & WIRE CONNECTIONS
⇒ +5V, +12V, -12V, -8V
⇒ SEE FAULTFINDING GUIDE I/O BOARD - ANALOG OUT PATH
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
DISTORTION?
YES
NO
HEADPHONE?
NO
CHECK:
• CONNECTION OF HEADPHONE
• HEADPHONE BOARD
⇒ WIRE CONNECTION
⇒ +12V (pin 6. J902), -12V (pin 4. J902)
⇒ KILL VOLTAGE (pin 7. J902) : -8V DURING PLAY
⇒ KILL TRANSISTORS Q903 - Q906
⇒ PLAY SBC442 DISC (1kHz, -30dB) AND CHECK SIGNAL AT TESTPOINTS 1, 2, 3 and 4
• I/O BOARD OPAMP Q901
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
DIGITAL AUDIO OUT?
NO
CHECK:
• AUDIO CONNECTIONS & CABLES
• I/O BOARD
⇒ FLEX & WIRE CONNECTIONS
⇒ +5V (pin 13. JJ01)
⇒ DIGITAL OUT TRANSFORMER LT02, Q311, OPT TRANSMITTER JT02
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
PLAY BACK OF CD-DA DISCS OK

Figure 6-2

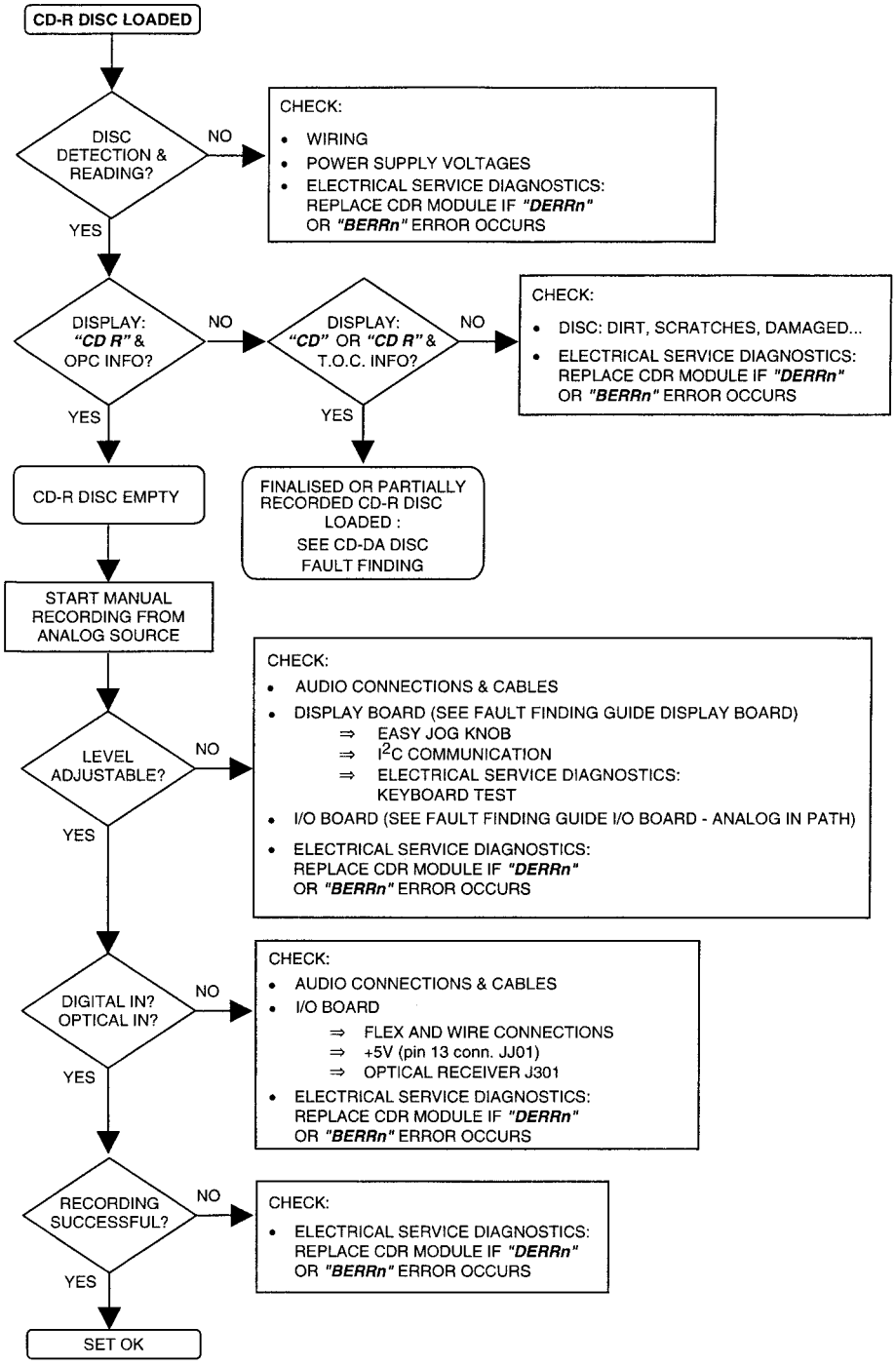

CD-R DISC LOADED
DISC DETECTION & READING?
NO
CHECK:
• WIRING
• POWER SUPPLY VOLTAGES
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
DISPLAY: "CD R" & OPC INFO?
NO
DISPLAY: "CD" OR "CD R" & T.O.C. INFO?
NO
CHECK:
• DISC: DIRT, SCRATCHES, DAMAGED...
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
YES
CD-R DISC EMPTY
FINALISED OR PARTIALLY RECORDED CD-R DISC LOADED : SEE CD-DA DISC FAULT FINDING
START MANUAL RECORDING FROM ANALOG SOURCE
LEVEL ADJUSTABLE?
NO
CHECK:
• AUDIO CONNECTIONS & CABLES
• DISPLAY BOARD (SEE FAULT FINDING GUIDE DISPLAY BOARD)
⇒ EASY JOG KNOB
⇒ I2C COMMUNICATION
⇒ ELECTRICAL SERVICE DIAGNOSTICS: KEYBOARD TEST
• I/O BOARD (SEE FAULT FINDING GUIDE I/O BOARD - ANALOG IN PATH)
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
DIGITAL IN? OPTICAL IN?
NO
CHECK:
• AUDIO CONNECTIONS & CABLES
• I/O BOARD
⇒ FLEX AND WIRE CONNECTIONS
⇒ +5V (pin 13 conn. JJ01)
⇒ OPTICAL RECEIVER J301
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
RECORDING SUCCESSFUL?
NO
CHECK:
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
SET OK

Figure 6-3

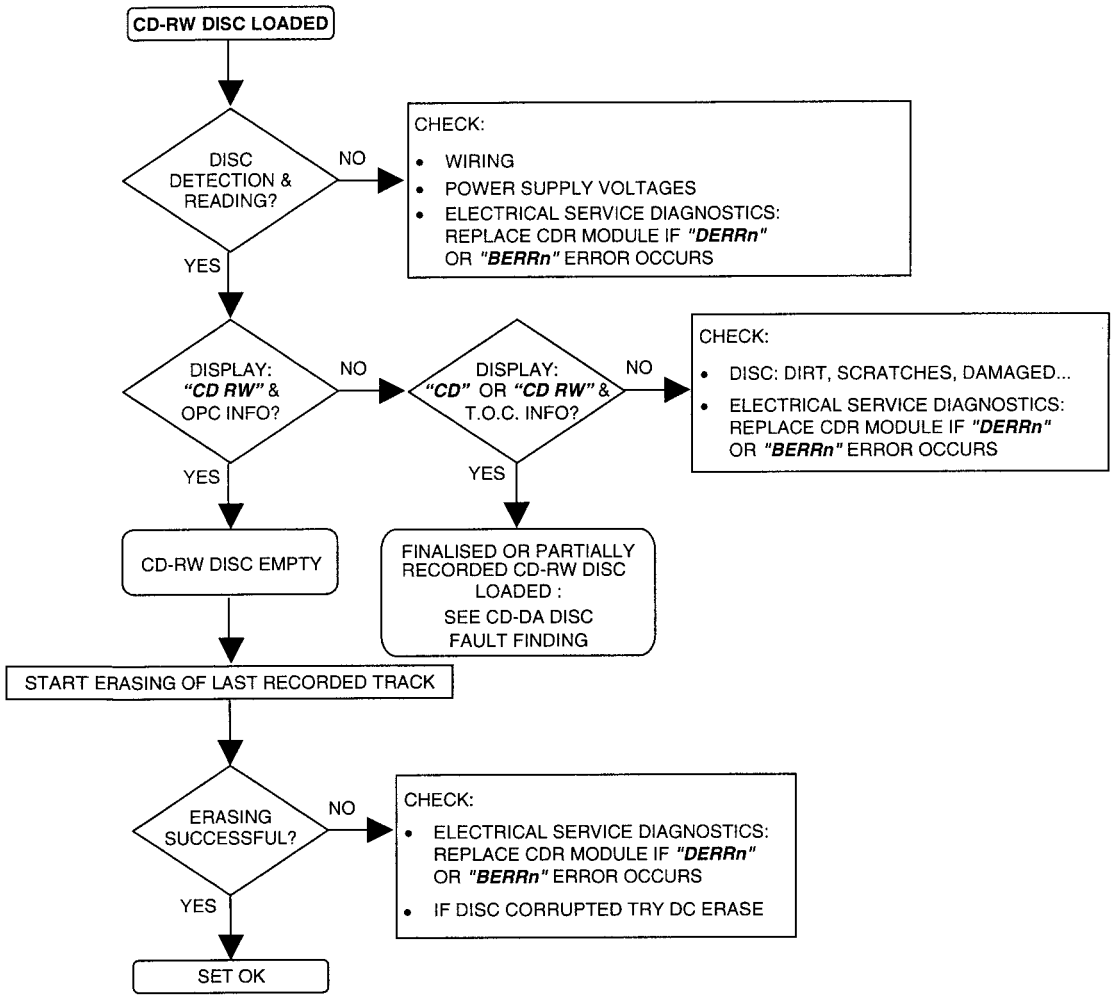

CD-RW DISC LOADED
DISC DETECTION & READING?
NO
CHECK:
• WIRING
• POWER SUPPLY VOLTAGES
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
DISPLAY: "CD RW" & OPC INFO?
NO
DISPLAY: "CD" OR "CD RW" & T.O.C. INFO?
NO
CHECK:
• DISC: DIRT, SCRATCHES, DAMAGED...
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
YES
YES
CD-RW DISC EMPTY
FINALISED OR PARTIALLY RECORDED CD-RW DISC LOADED :
SEE CD-DA DISC FAULT FINDING
START ERASING OF LAST RECORDED TRACK
ERASING SUCCESSFUL?
NO
CHECK:
• ELECTRICAL SERVICE DIAGNOSTICS: REPLACE CDR MODULE IF "DERRn" OR "BERRn" ERROR OCCURS
• IF DISC CORRUPTED TRY DC ERASE
YES
SET OK

Figure 6-4

7. Faultfinding Guide

7.1 Display Board

7.1.1 Description of display board

General description

The display board has three major parts : the FTD (Fluorescent Tube Display), the display controller TMP87CH74F and the keyboard. The display controller is controlled by the DASP master processor on the CDR main board. The communication protocol used is I2C. So all the information between DASP and display controller goes via the SDA or I2C DATA and SCL or I2C CLK lines. Communication is always initiated by the DASP on the CDR main board. Unlike the previous generations of CDR players, the interrupt generated by the display controller at key-press or reception of remote control is not used. Instead, the DASP polls the display controller for these events.

Display controller TMP87CH74F

TMP87CH74F (QY01) is a high speed and high performance 8-bit single chip microprocessor, containing 8-bit A/D conversion inputs and a VFT (Vacuum Fluorescent Tube) driver.

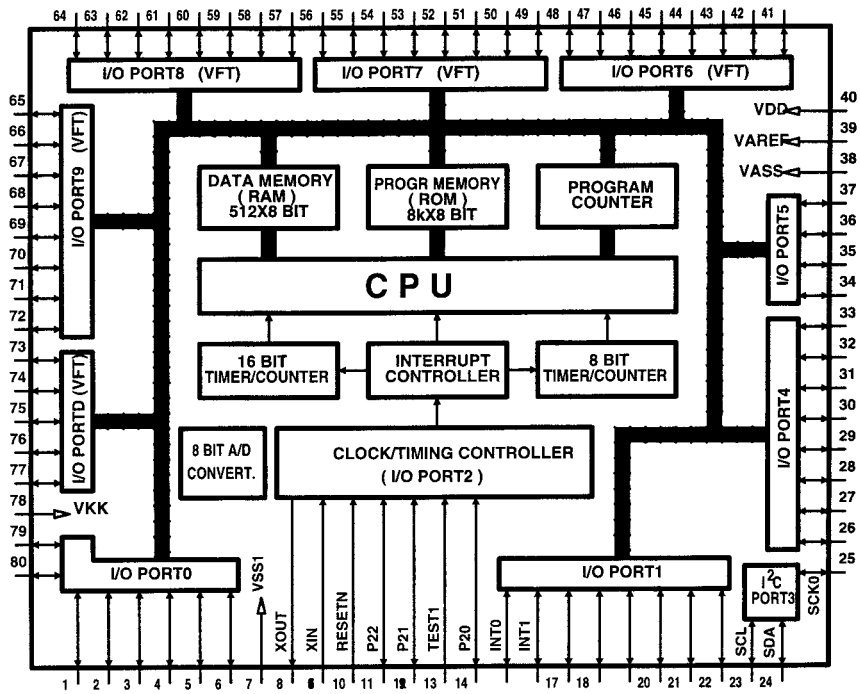
In this application, its functions are :

- slave microprocessor.
- FTD driver.
- generates the square wave for the filament voltage required for an AC FTD.
- generates the grid and segment scanning for the FTD.
- generates the scanning grid for the key matrix.
- input for remote control.

All the communication runs via the serial bus interface I2C. The display controller uses an 8Mhz resonator as clock driver.

BLOCK DIAGRAM

TMP87C874F



PIN DESCRIPTIONS

INT0	external interrupt input 0
INT1	external interrupt input 1
RESETN	reset signal input, active low
SCL	I2C-bus serial clock input/output
SDA	I2C-bus serial data input/output
TEST	test pin, tied to low
VAREF	analog reference voltage input
VASS	analog reference ground
VDD	+5V
VKK	VFT driver power supply
VSS	ground
XIN, XOUT	resonator connecting pins for high-frequency clock

Figure 7-1

7.1.2 Test instructions

Supply voltages

The display board receives several voltages via connector JY01.

- VFTD : -30V ±5% measured at pin 2 of conn. JY01.
- VDC1-VDC2 : 4V3 ±10% measured between pin 1 and 3 of conn. JY01.
- +5V : + 5V ±5% measured at pin 10 of conn. JY01.

Voltages VFTD, VDC1 and VDC2 are produced in the I/O Board and sent to the display board via the CDR main board. The +5V voltage is produced on the CDR main board as D5V.

Clock signal

As clock driver for the display controller, a resonator of 8 Mhz (XY01) is used. The signal can be measured at pins 8 and 9 of the display controller : 8 Mhz ±5%.

Control signals

RESETN

The reset signal comes via pin 4 of conn. JY01 from the DASP master processor on the CDR main board (SYS_RESET). The reset is low active. It should be kept low during power up for at least 3 machine cycles with supply voltage in operating range and a stable clock signal (1 machine cycle = 12 x 1/Fc (8 Mhz) sec.). During normal operation, the reset should be high (3V3). The high signal is 3V3 because the DASP operates on 3V3.

I2C DATA/I2C CLK

These lines connect to the DASP master processor via respectively pin 5 and pin 7 of conn. JY01. When there is no communication, they should have the high level (+5V). The oscillogram below gives an indication of how these signals should look like.

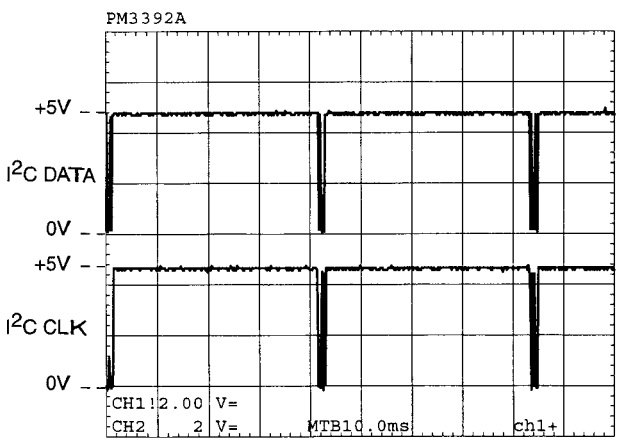


Figure 7-2 "I2C SIGNALS"

FTD drive lines

Filament voltage

Should measure 4.3V ±10% (=VDC1-VDC2) between pins 1-2 and pins 52-53 of FTD(VY01).

Grid lines

Level and timing of all grid lines, G1-->G15, can be checked either at the FTD itself or at the display controller. Grid lines G13, G14 and G15 each have an extra current amplifier in line : QY04 for G13, QY03 for G14 and QY02 for G15. A typical grid line signal shows in the oscillogram below.

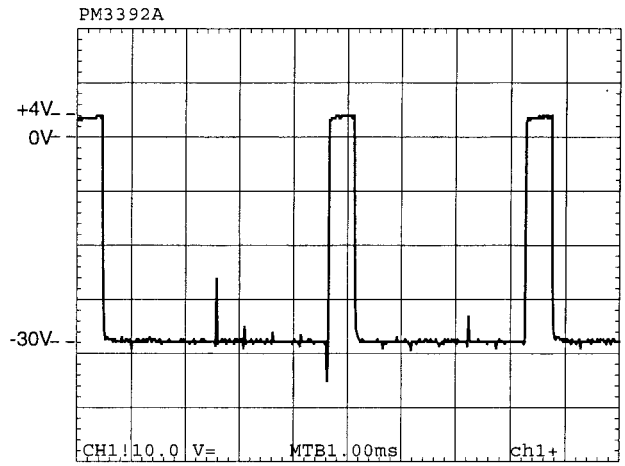


Figure 7-3 "OSD"

Segment lines

Level and timing of all segment lines, P-->P21, can be checked either at the FTD itself or atthe display controller. The data on these segment lines however, depends on the characters displayed. The oscillogram below shows a segment line with data. A segment line without data maintains a -30V level.

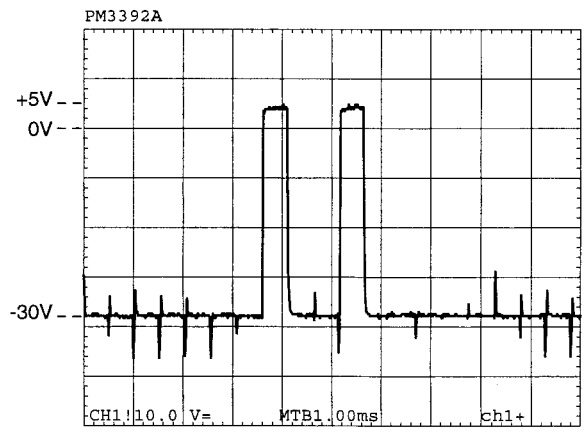
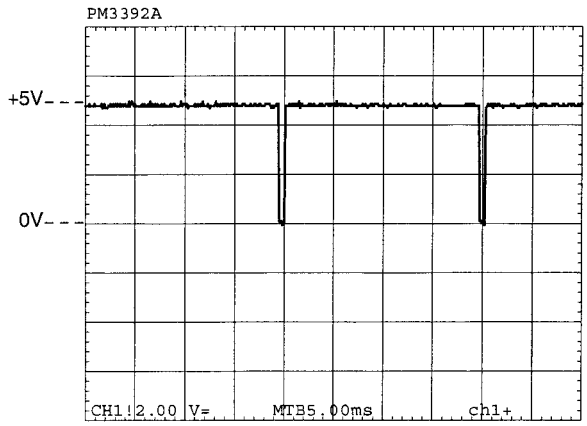


Figure 7-4 "SEGMENT LINE"

Key matrix lines

The lines connected to pins 34, 35, 36 and 37 of the display controller act as matrix scanners. Without a key pressed, they maintain a low level. As soon as a key is pressed, the scanning line connected to that key puts out a scanning signal, which should look like the oscillogram below. This scanning signal goes via the pressed key to I/O port 4 of the display controller (pins 28 to 33). The display controller can now determine which key has been pressed. Without a key pressed, pins 28 to 33 of the display controller maintain a high level (+5V).



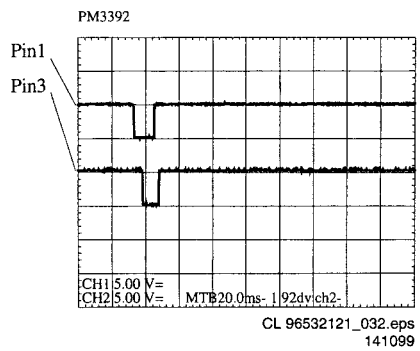
CL 96532121_031.eps
141099

Figure 7-5 KEY MATRIX SCAN LINE

Easy jog knob

Rotary operation

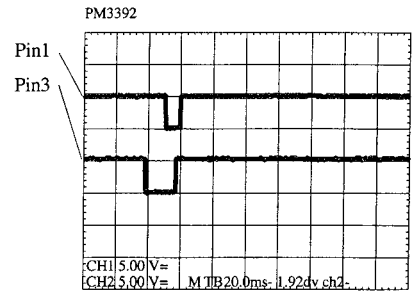
The easy jog knob (SY26) incorporates a whole heap of user control possibilities in just one knob. Without the knob being operated, pin 1 and 3 of the knob (and thus pin 16 and 17 of the display controller), maintain the +5V level. Turning the knob clockwise briefly connects pin 1 to GND followed by pin 3.



CL 96532121_032.eps
141099

Figure 7-6 TURN CLOCKWISE

Turning the knob anti-clockwise briefly connects pin 3 to GND followed by pin 1.



CL 96532121_033.eps
141099

Figure 7-7 TURN ANTI-CLOCKWISE

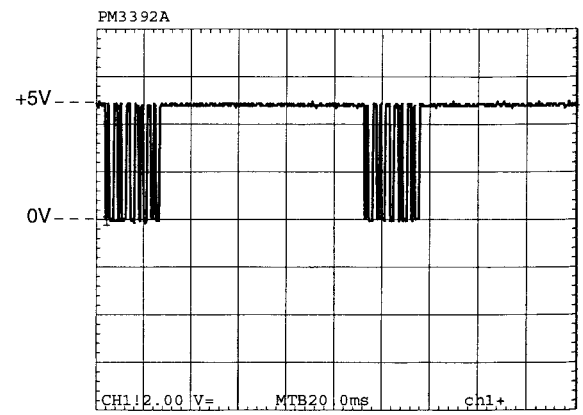
The pulses created this way arrive at pin 16 and 17 of the display controller. The first pulse to arrive tells the controller the direction of the rotation. Counting the pulses reveals the amount of rotation. Combining and decoding this information, the display controller will execute the appropriate task.

Push button operation

This button connects to the key matrix lines and thus the operation is identical to the ordinary keys. Without being pressed, pin 4 of the easy jog maintains the low level, pin 5 the high level. When pressed the scanning signal goes through the closed contact of pins 4 and 5, and can be checked at both pins.

IR receiver - remote control

In the DR6000 the IR receiver ZY01 is mounted on the display board. In all versions the IR receiver connects to the display controller. The signal coming from the receiver can be checked at pin 22 of the display controller. This signal is normally high (+5V). When the remote control is being operated, pulses mixed in with the +5V can be measured. The oscillogram gives an indication of how the signal looks like with the RC being operated.



CL 96532121_034.eps
141099

Figure 7-8 IR RECEIVER SIGNAL

7.1.3 Display board troubleshooting guide

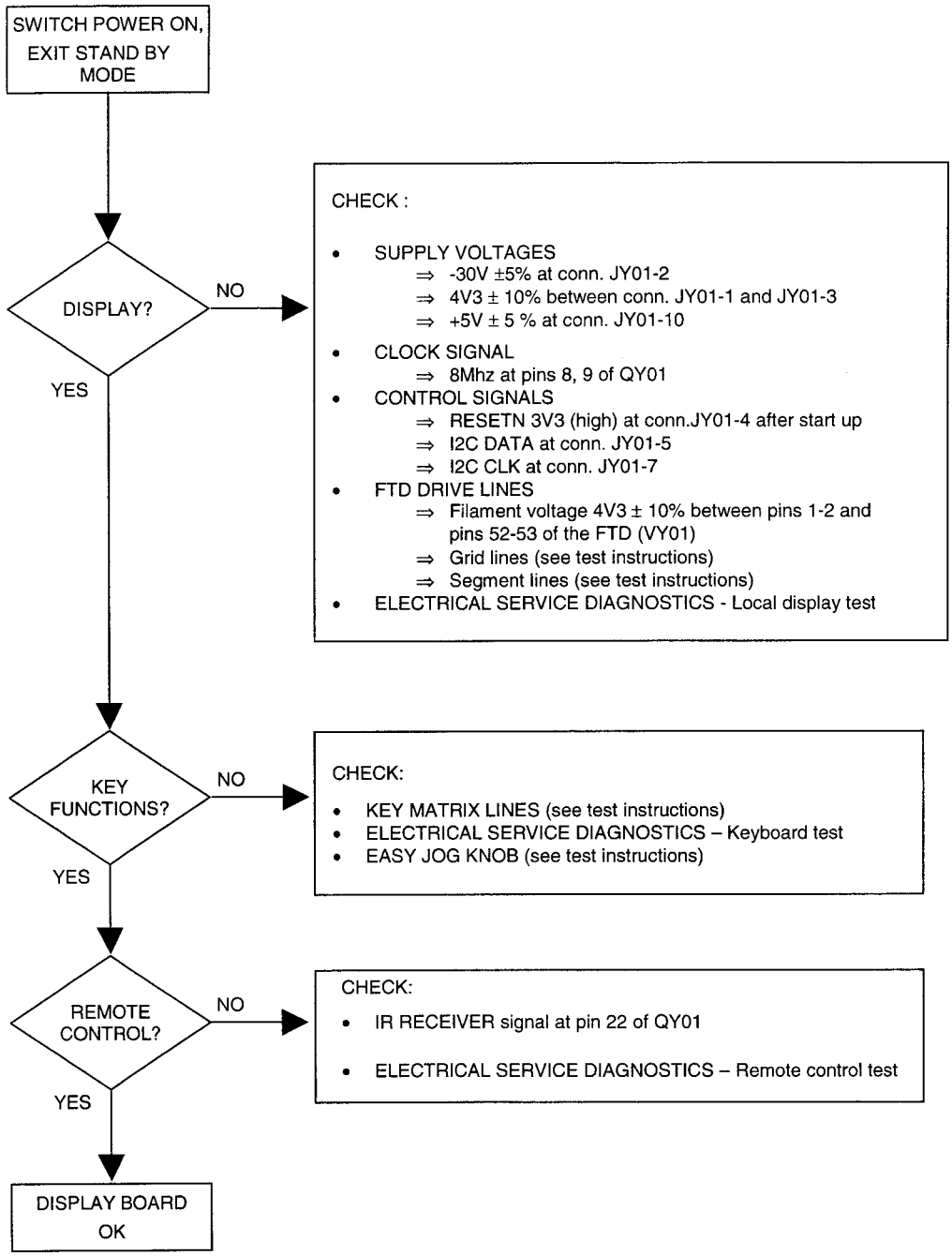

SWITCH POWER ON, EXIT STAND BY MODE
DISPLAY?
NO
YES
CHECK :
• SUPPLY VOLTAGES
⇒ -30V ±5% at conn. JY01-2
⇒ 4V3 ± 10% between conn. JY01-1 and JY01-3
⇒ +5V ± 5 % at conn. JY01-10
• CLOCK SIGNAL
⇒ 8Mhz at pins 8, 9 of QY01
• CONTROL SIGNALS
⇒ RESETN 3V3 (high) at conn.JY01-4 after start up
⇒ I2C DATA at conn. JY01-5
⇒ I2C CLK at conn. JY01-7
• FTD DRIVE LINES
⇒ Filament voltage 4V3 ± 10% between pins 1-2 and pins 52-53 of the FTD (VY01)
⇒ Grid lines (see test instructions)
⇒ Segment lines (see test instructions)
• ELECTRICAL SERVICE DIAGNOSTICS - Local display test
KEY FUNCTIONS?
NO
YES
CHECK:
• KEY MATRIX LINES (see test instructions)
• ELECTRICAL SERVICE DIAGNOSTICS – Keyboard test
• EASY JOG KNOB (see test instructions)
REMOTE CONTROL?
NO
YES
CHECK:
• IR RECEIVER signal at pin 22 of QY01
• ELECTRICAL SERVICE DIAGNOSTICS – Remote control test
DISPLAY BOARD OK

Figure 7-9

7.2 I/O Board

The I/O board for the DR6000 is a full high performance AD/DA panel, acting as an interface to the outside world. Key components are DS1807, ADC AK5351 and DAC TDA1305.

7.2.1 Analog-in path

Description

The via cinch connected anolog-in L and R signals are pre-amplified by opamp Q701 after which they are presented to an adjustable amplifier made out of DS1807 and opamp Q706. The level of the incoming
analog signal is adjusted by means of control lines "I^2S" coming from the DASP on the CDR main board and switching the mux/demux. The anolog signal is then presented to the A/D converter A5351 (Q703) where they are converted from analog to I^2S-bus data format. The I^2S-bus is connected via connector JJ01 and flex to the DASP on the CDR main board. The ADC uses the CL11-clock (11.2896 MHz), coming from the DASP on the CDR main board.

ADC AK5351

Description

The AK5351 is a stereo, 20-bit oversampling ADC based on Sigma Delta technology intended primarily for digital audio bandwith applications. It supports the I2S-bus data format. The device can be used in either slave or master mode. In this application it is used in slave mode receiving it's clock from the DASP on the CDR main board.

Pin description

No.	Pin Name	I/O	PIN / FUNCTION
1	AINR+	I	Right channel analog positive input pin
2	AINR-	I	Right channel analog negative input pin
3	VREF	O	Voltage Reference output pin (VA-2.6V) Normally connected to VA with a 0.1uF ceramic capacitor in parallel with a 10uF electrolytic capacitor.
4	VA		Analog section Analog Power Supply, +5V
5	AGND		Analog section Analog Ground
6	AINL+	I	Left channel analog positive input pin
7	AINL-	I	Left channel analog negative input pin
8	TST1		Test pin Should be left floating. (Pull- down pin)
10	TST2		Test pin Should be left floating. (Pull- down pin)
11	TST3		Test pin Should be left floating. (Pull- down pin)
14	TST4		Test pin Should be left floating. (Pull- down pin)
9	HPFE	I	High Pass Filter Enable pin (Pull- up pin) "H": ON "H": OFF
12	VD		Digital section Digital Power Supply pin, +5V
13	DGND		Digital section Digital Ground pin
16	PD	I	Power Down pin "L" brings the device into power-down mode. Must be done once after power-on.
17	MCLK	I	Master Clock input pin CMODE="H" : 384fs CMODE="L" : 256fs
18	SCLK	I/O	Serial Data Clock pin Data is clocked out at the falling edge of SCLK. Slave mode: 64fs clock is input usually. Master mode: SCLK outputs a 64fs clock. SCLK stays low during the power-down mode($\overline{PD}$="L").
19	LRCK	I/O	L/R Channel Clock Select pin Slave mode: An fs clock is fed to this LRCK pin. Master mode: LRCK output an fs clock. LRCK goes "H" at SMODE2="L" and "L" at SMODE2="H" during reset when SMODE1 "H".
20	FSYNC	I/O	Frame Synchronization Signal pin Slave mode: When "H", data bits are clocked out on SDATA. As I^2S slave mode ignores FSYNC It should hold "L" or "H". Master mode: FSYNC outputs 2fs clock. Stay low during the power-down mode($\overline{PD}$="L") .
21	SDATA	O	Serial Data Output pin Data are output with MSB first, in 2's complement format. After 20 bits are output it turns to "L". It also remains "L" at a power- down mode($\overline{PD}$="L").
22	CMODE	I	Master Clock Selection pin "L": MCLK=256fs "H": MCLK=384fs
23	SMODE1	I	Serial Interface Mode Select pin
15	SMODE2	I	Defines the directions of LRCK, SCLK and FSYNC pins and Output Data Format. SMODE2 is pull- down pin. SMODE1 SMODE2 MODE LRCK L L Slave mode: MSB justified : H/L H L Master mode Similar to I^2S : H/L L H Slave mode: I^2S : L/H H H Master mode: I^2S : L/H
24	VB		Substrate Power Supply, +5V

Figure 7-11

Block diagram

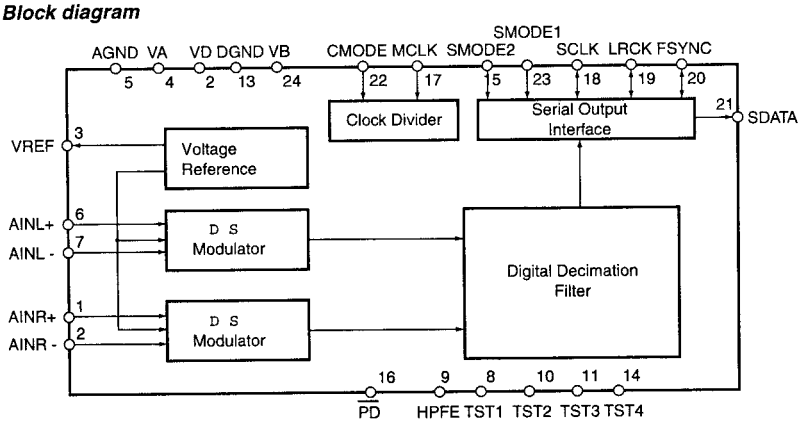


Figure 7-10

Addressable Dual Audio Taper Potentionmeter : DS1807

Block diagram

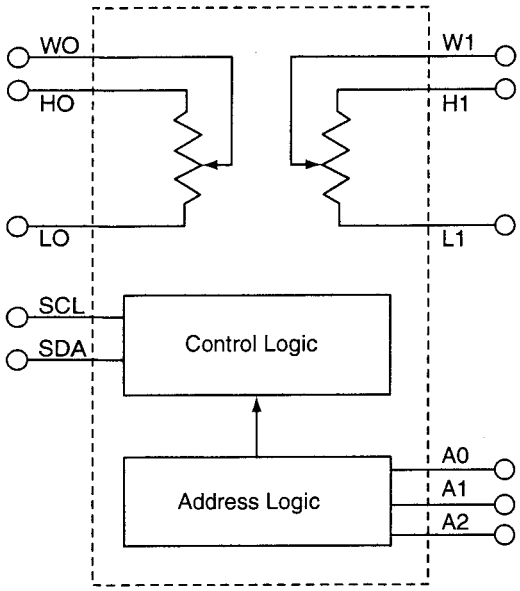


Figure 7-12

Pin description

PIN	DESCIPTION
L0, L1	Low End of Resistor
H0, H1	High End of Resistor
W0,W1	Wiper Terminal of Resistor
VCC	3V/5V Power Supply Input
A0..A2	Chip Select Inputs
SDA	Serial Data I/O
SCL	Serial Clock Input
GND	Digital Ground
AGND	Analog Ground
NC	No connection

Figure 7-14

7.2.2 Analog-out path

Description

The I2S-bus data format being the digital output signal, goes from the DASP on the CDR main board via flex and connector JJ01 to the I/O board. Here it is presented to the D/A converter TDA1305. The DAC's analog outputs pass an amplification circuit (opamp Q601). After amplification the analog-out L and R signals pass the filtering circuit and are sent to both the headphone connector on the headphone board and the HDAM circuit, analog out cinch connectors on the I/O board. The DAC uses the CL11-clock (11.2896 MHz), coming from the DASP on the CDR main board.

DAC TDA1305

Description

The TDA1305 is a high performance, single-chip stereo, audio DAC delivering 106dB dynamic range sample rate.

Block diagram

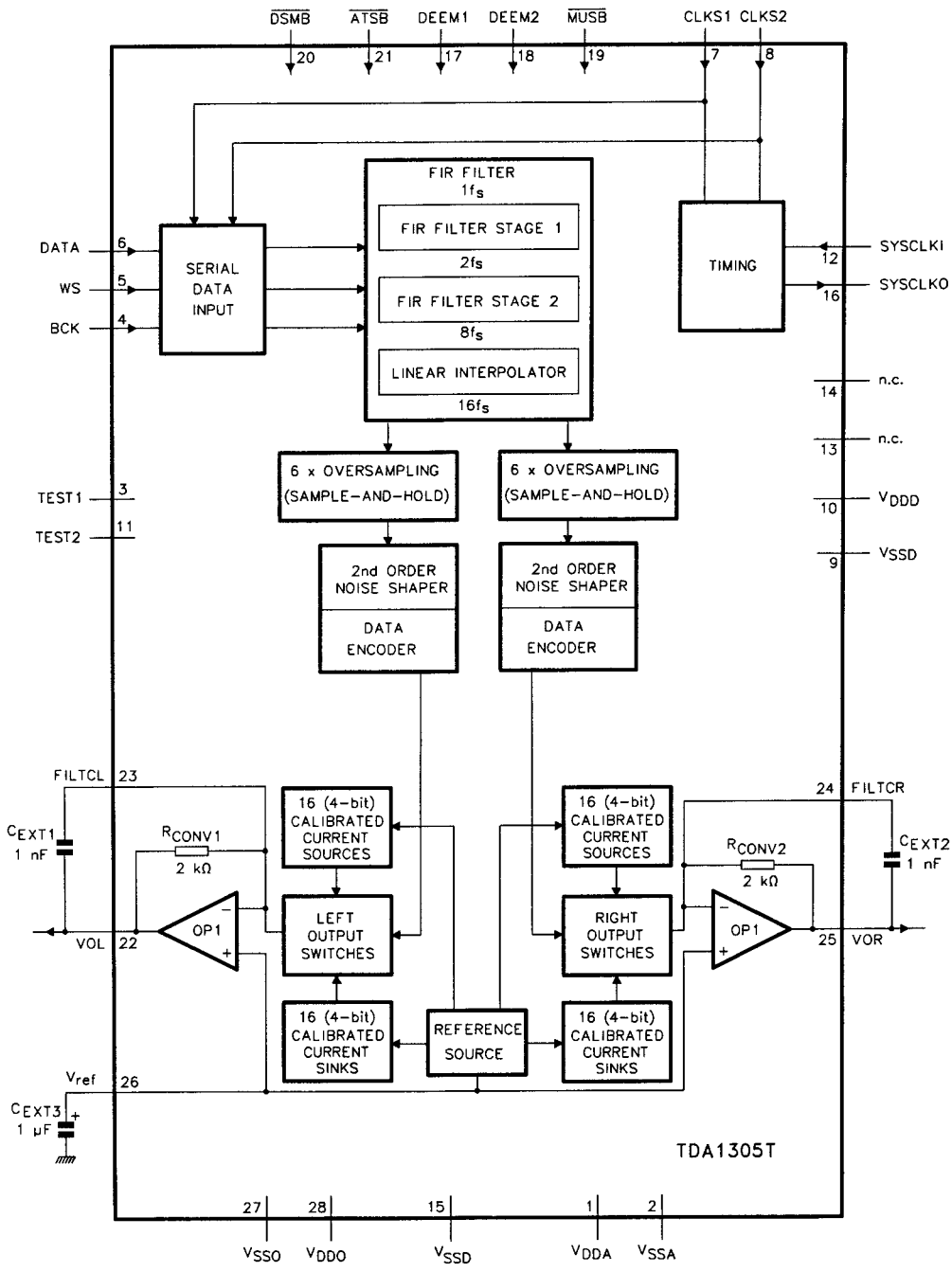


Figure 7-15

Pin configuration and description

PINNING

SYMBOL	PIN	DESCRIPTION
V_{DDA}	1	analog supply voltage
V_{SSA}	2	analog ground
TEST1	3	test input; pin should be connected to ground (internal pull-down resistor)
BCK	4	bit clock input
WS	5	word select input
DATA	6	data input
CLKS1	7	clock selection 1 input
CLKS2	8	clock selection 2 input
V_{SSD}	9	digital ground
V_{DDD}	10	digital supply voltage
TEST2	11	test input; pin should be connected to ground (internal pull-down resistor)
SYSCLKI	12	system clock input
n.c.	13	not connected (this pin should be left open-circuit)
n.c.	14	not connected (this pin should be left open-circuit)
V_{SSD}	15	digital ground
SYSCLKO	16	system clock output
DEEM1	17	de-emphasis on/off; f_{DEEM} 32 kHz, 44 kHz and 48 kHz
DEEM2	18	de-emphasis on/off; f_{DEEM} 32 kHz, 44 kHz and 48 kHz
$\overline{MUSB}$	19	mute input (active LOW)
$\overline{DSMB}$	20	double-speed mode input (active LOW)
$\overline{ATSB}$	21	12 dB attenuation input (active LOW)
VOL	22	left channel output
FILTCL	23	capacitor for left channel 1st order filter function should be connected between pins 22 and 23
FILTCR	24	capacitor for right channel 1st order filter function should be connected between pins 25 and 24
VOR	25	right channel output
V_{ref}	26	internal reference voltage for output channels ($0.5V_{DD}$)
V_{SSO}	27	operational amplifier ground
V_{DDO}	28	operational amplifier supply voltage

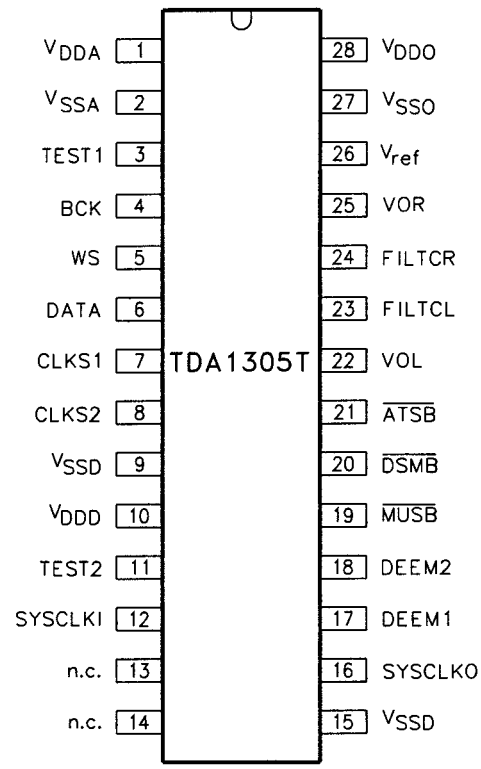


Figure 7-16

Troubleshooting analog-out path

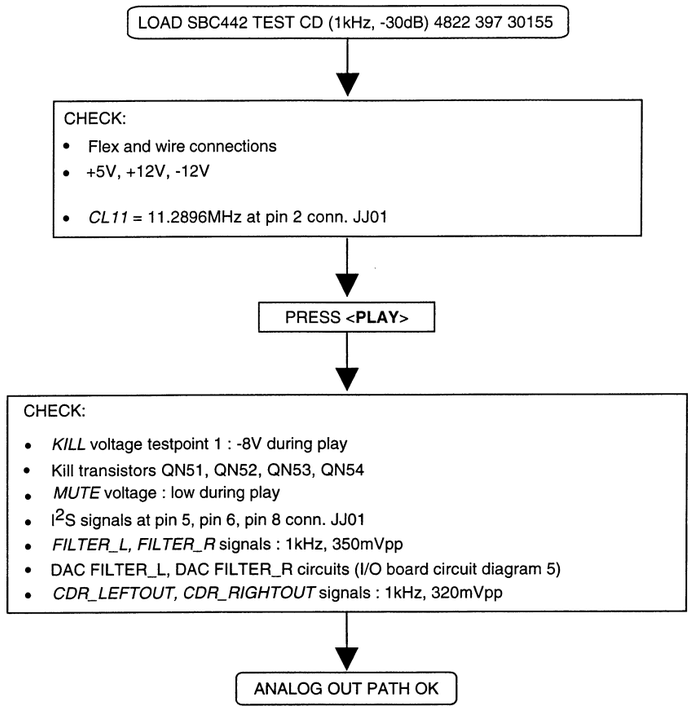

LOAD SBC442 TEST CD (1kHz, -30dB) 4822 397 30155
CHECK:
• Flex and wire connections
• +5V, +12V, -12V
• CL11 = 11.2896MHz at pin 2 conn. JJ01
PRESS <PLAY>
CHECK:
• KILL voltage testpoint 1 : -8V during play
• Kill transistors QN51, QN52, QN53, QN54
• MUTE voltage : low during play
• I2S signals at pin 5, pin 6, pin 8 conn. JJ01
• FILTER_L, FILTER_R signals : 1kHz, 350mVpp
• DAC FILTER_L, DAC FILTER_R circuits (I/O board circuit diagram 5)
• CDR_LEFTOUT, CDR_RIGHTOUT signals : 1kHz, 320mVpp
ANALOG OUT PATH OK

Figure 7-17

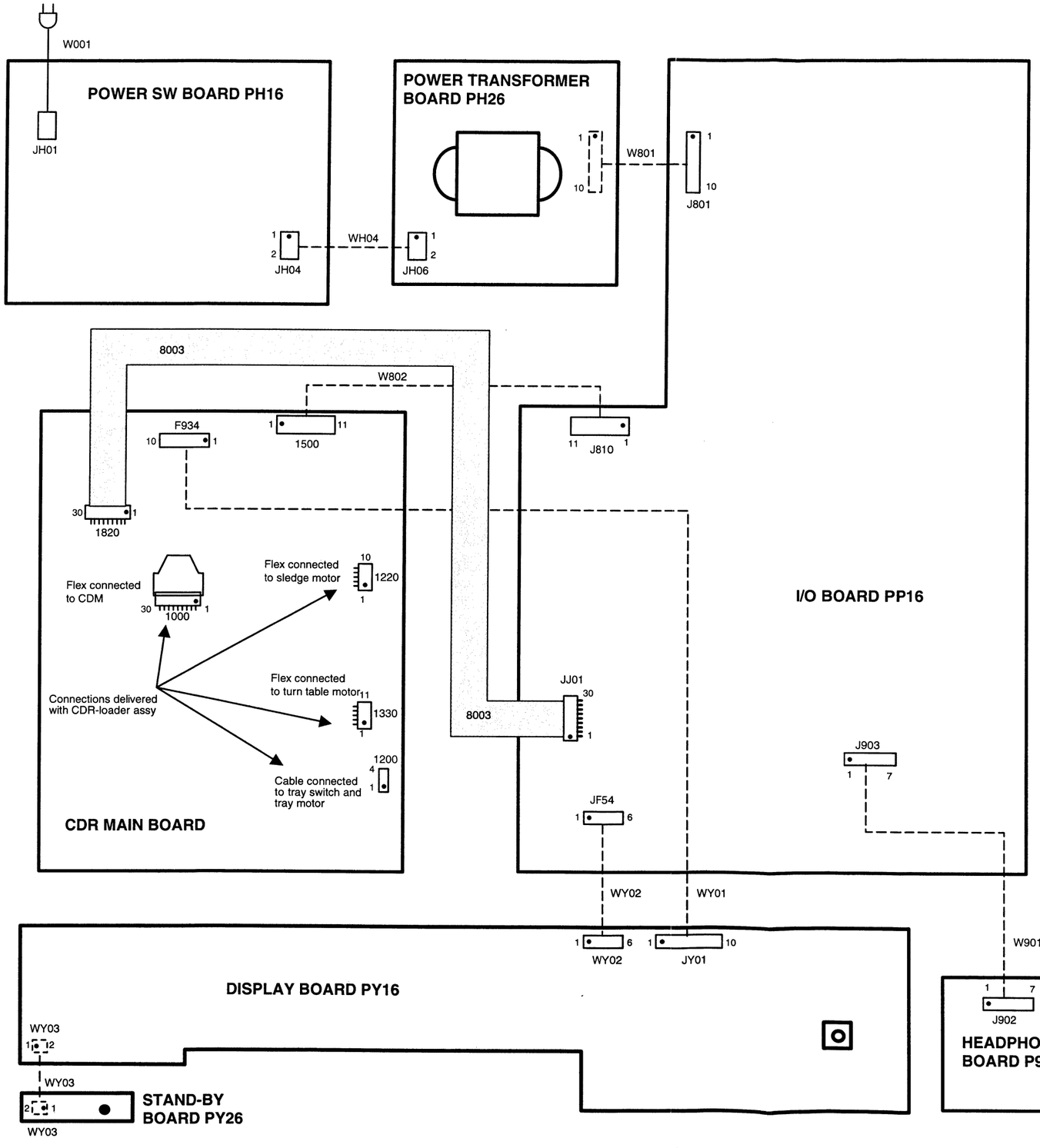
7.2.3 Digital in/out paths

There is a cinch digital-in paths and an optical path taking the digital signals pretty much straight to the DASP on the CDR main board. The optical-out and the digital-out path take the signal from the DASP on the CDR main board to their respective output connectors on the I/O board.

7.3 Headphone board

The L and R analog signals coming from the analog output on the I/O board pass an adjustable amplifier (opamp Q901) after which they are passed on to the headphone connector. The amplification is adjusted by means of a potentiometer positioned at the front of the CDR player.

8. WIRING DIAGRAM



WH04

1	COLD
2	HOT

W801

1	12VA
2	GND
3	12VA
4	12VD
5	GND
6	12VA
7	5VD
8	5VD
9	FR
10	FR

W802

1	-8V
2	+12V
3	GND
4	GND
5	GND
6	+5VD
7	+5VD
8	GND
9	DC1
10	VFTD
11	DC2

W901

1	LCH
2	GND
3	RCH
4	-12V
5	GND
6	+12V
7	MUTE

WY01

1	VDC2
2	VFTD
3	VDC1
4	SYS- RESET
5	IIC- DATA
6	GND
7	IIC- CLK
8	DISPL- INT
9	GND
10	+5VD

WY02

1	RC-5 OUT
2	RC-5 IN
3	STAND-BY
4	IIC-CLK
5	IIC-DATA
6	RESET

WY03

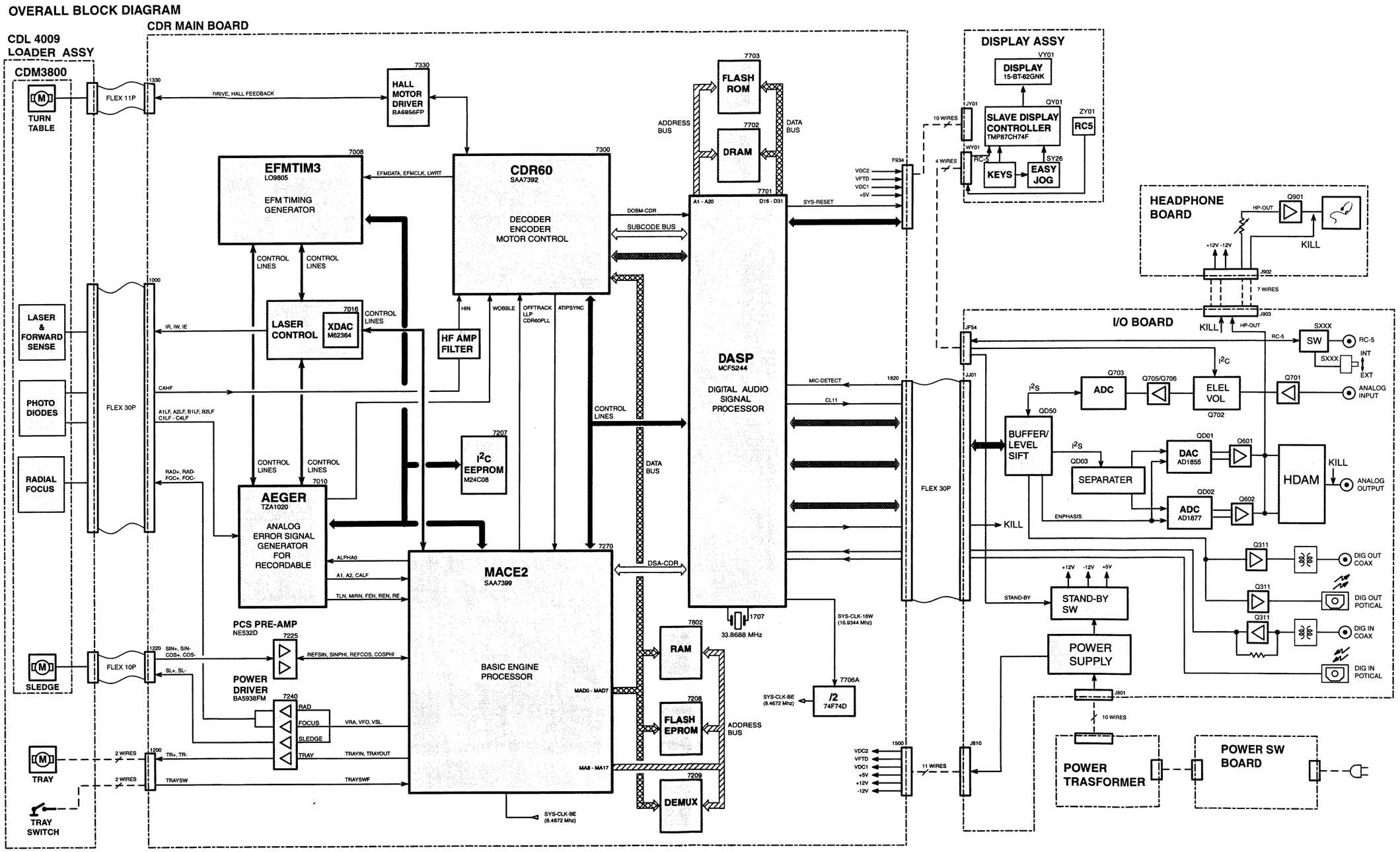
1	STAND-BY
2	GND

8003 (at conn. JJ01 of I/O Board)

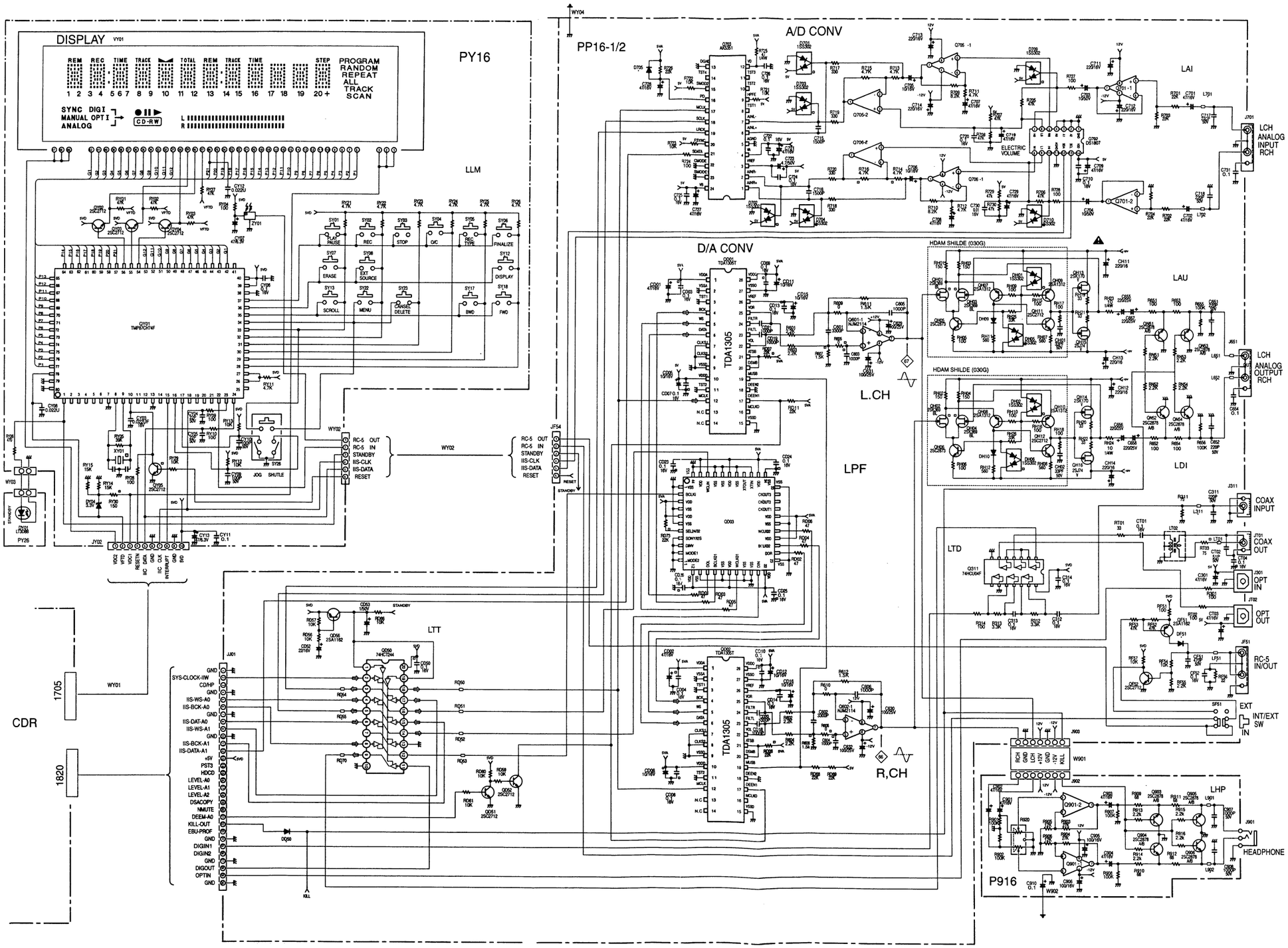
1	GND
2	SYS-CLOCK
3	CD/HP
4	GND
5	IIS-WS-A0
6	IIS-BCK-A0
7	GND
8	IIS-DATA-A0
9	IIS-WS-A1
10	GND
11	IIS-BCK-A1
12	IIS-DATA-A1
13	-5VD
14	PST3
15	HDCD
16	LEVEL-A0
17	LEVEL-A1
18	LEVEL-A2
19	IDSP-COPY
20	N MUTE
21	DEEM-A0
22	KILL-OUT
23	EBU-PROF
24	GND
25	DIG-IN1
26	DIG\IN2
27	GND
28	DIG-OUT
29	OPT-IN
30	GND

9. BLOCK DIAGRAM

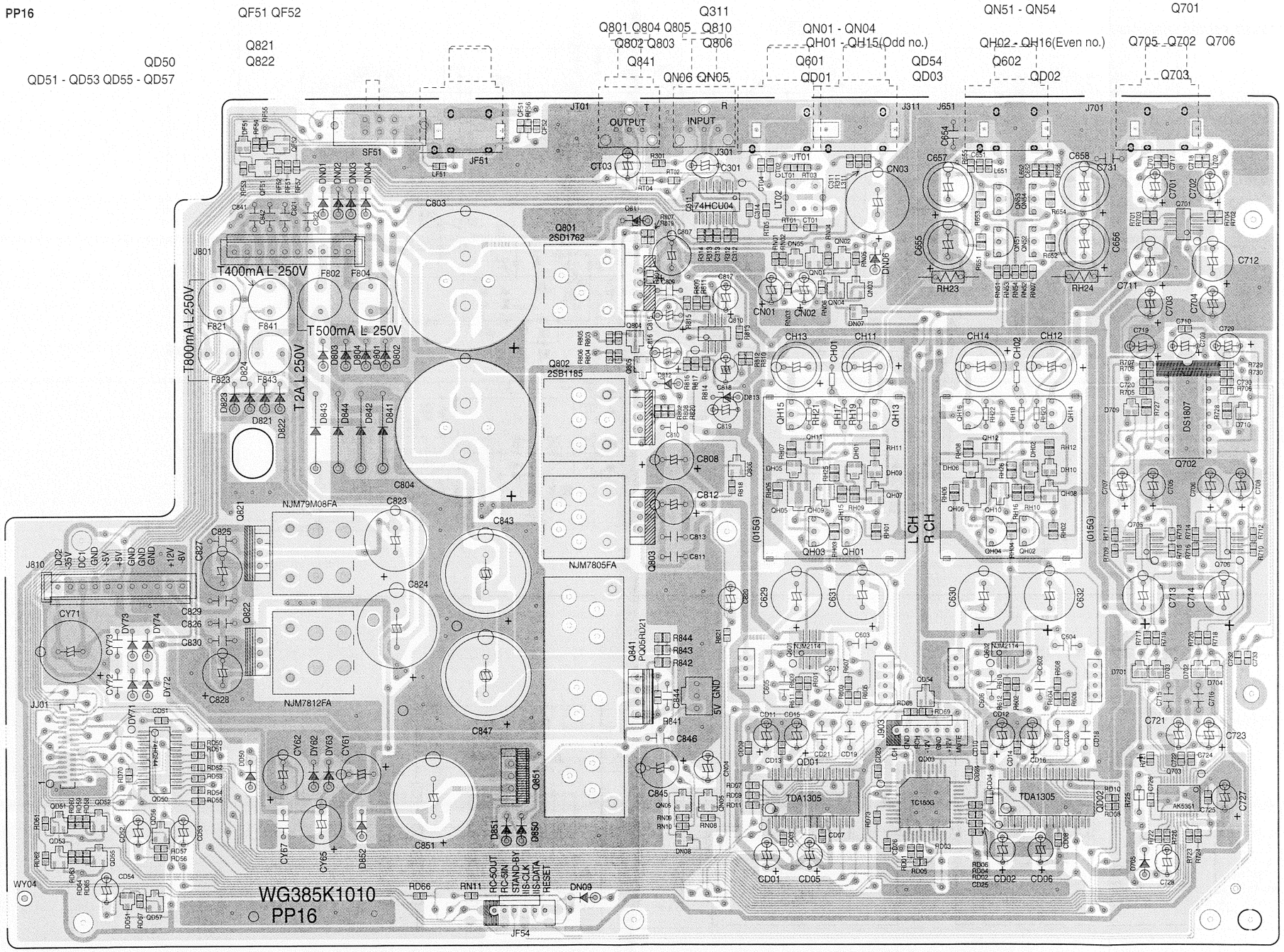
OVERALL BLOCK DIAGRAM



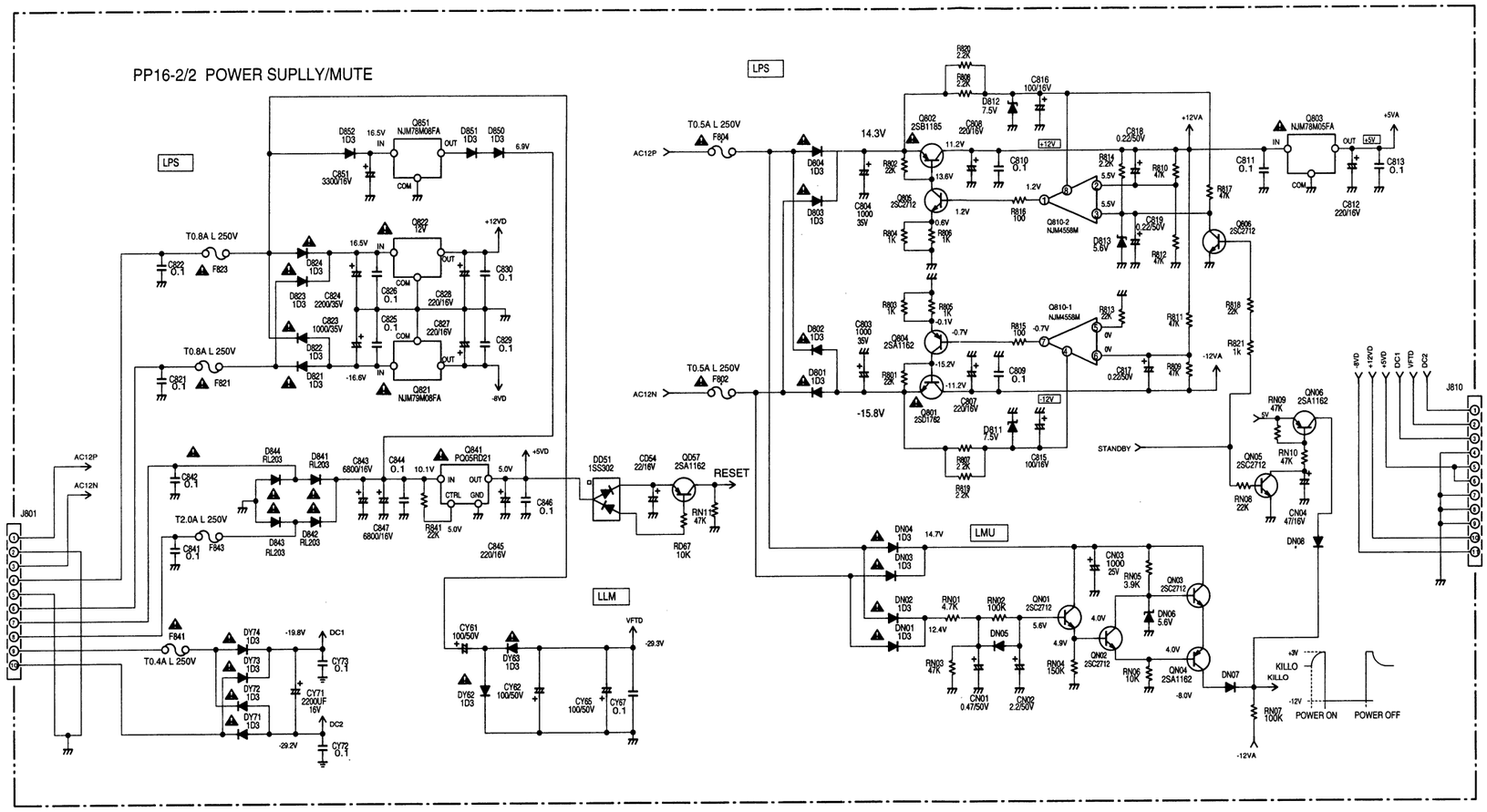
10. SCHEMATIC DIAGRAM AND PARTS LOCATION

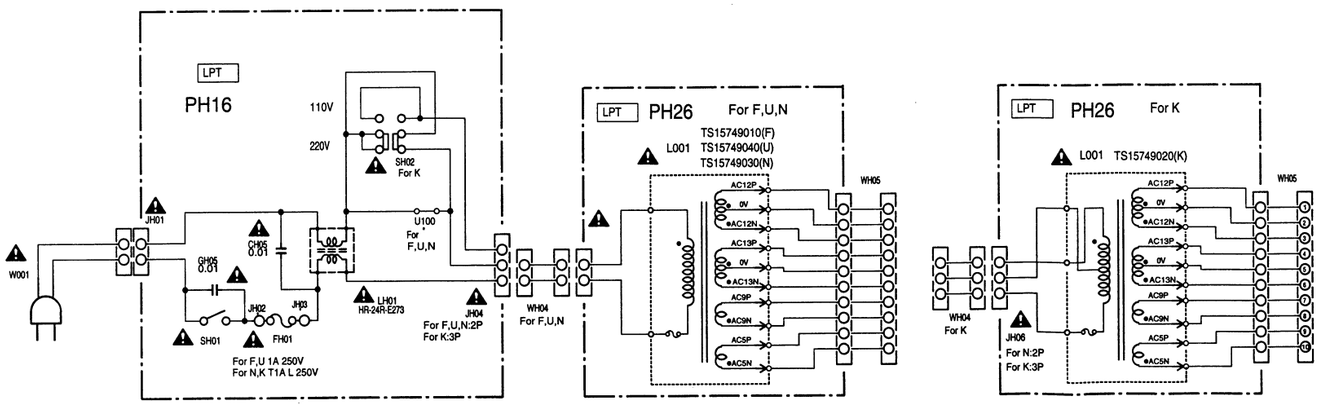


PP16


QF51 QF52
Q821
Q822
QD50
QD51 - QD53 QD55 - QD57
Q311
Q801 Q804 Q805 Q810
Q802 Q803 Q806
Q841
QN06 QN05
QN01 - QN04
QH01 - QH15(Odd no.)
Q601
QD01
QD54
QD03
QN51 - QN54
QH02 - QH16(Even no.)
Q602
QD02
Q701
Q705 Q702 Q706
Q703
JT01
OUTPUT
INPUT
SF51
JF51
J801
T400mA L 250V
T800mA L 250V
T500mA L 250V
T2A L 250V
Q801
2SD1762
Q802
2SB1185
74HCU04
NJM79M08FA
NJM7805FA
NJM7812FA
Q841
PQ05RD21
TDA1305
TC160G
AK5351
DS1807
J810
JJ01
WY04
WG385K1010
PP16
JF54
RC-SOUT
RC-SIN
STAND-BY
IIS-CLK
IIS-DATA
RESET
5V GND
LCH
RCH
(015G)

PP16-2/2 POWER SUPLLY/MUTE



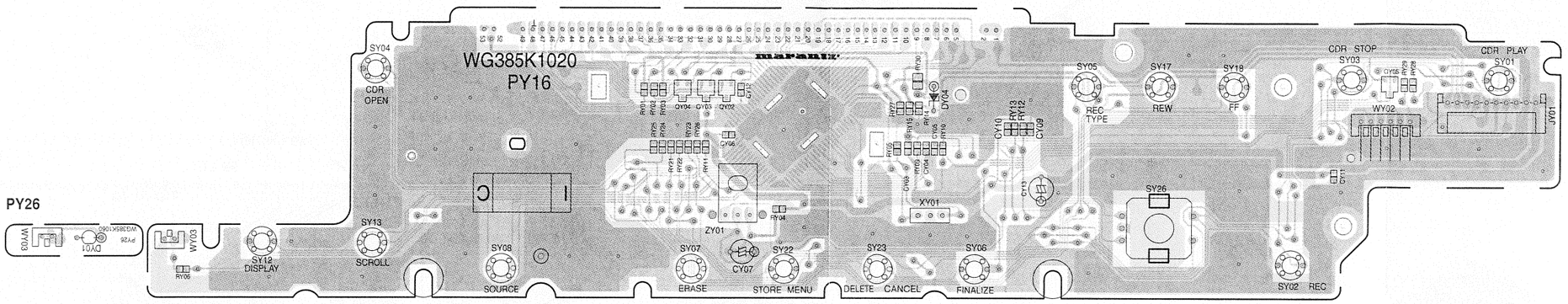


PY16

QY04 QY03 QY02

QY01

QY05

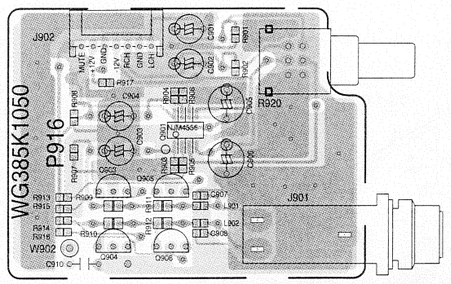


P916

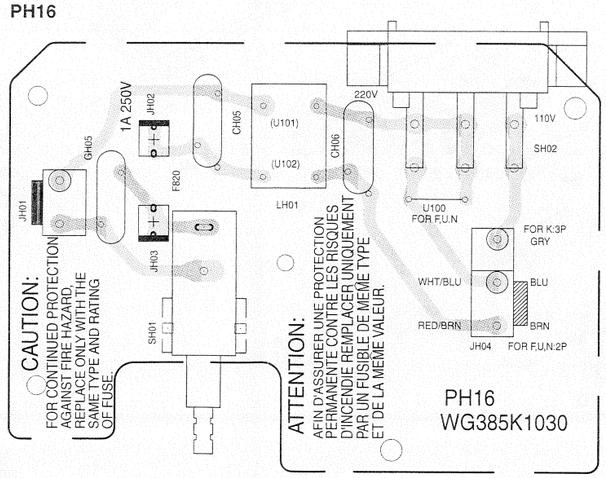
Q901

Q903 Q905

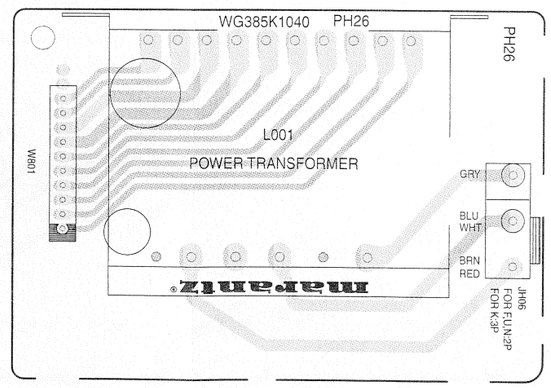
Q904 Q906



PH16



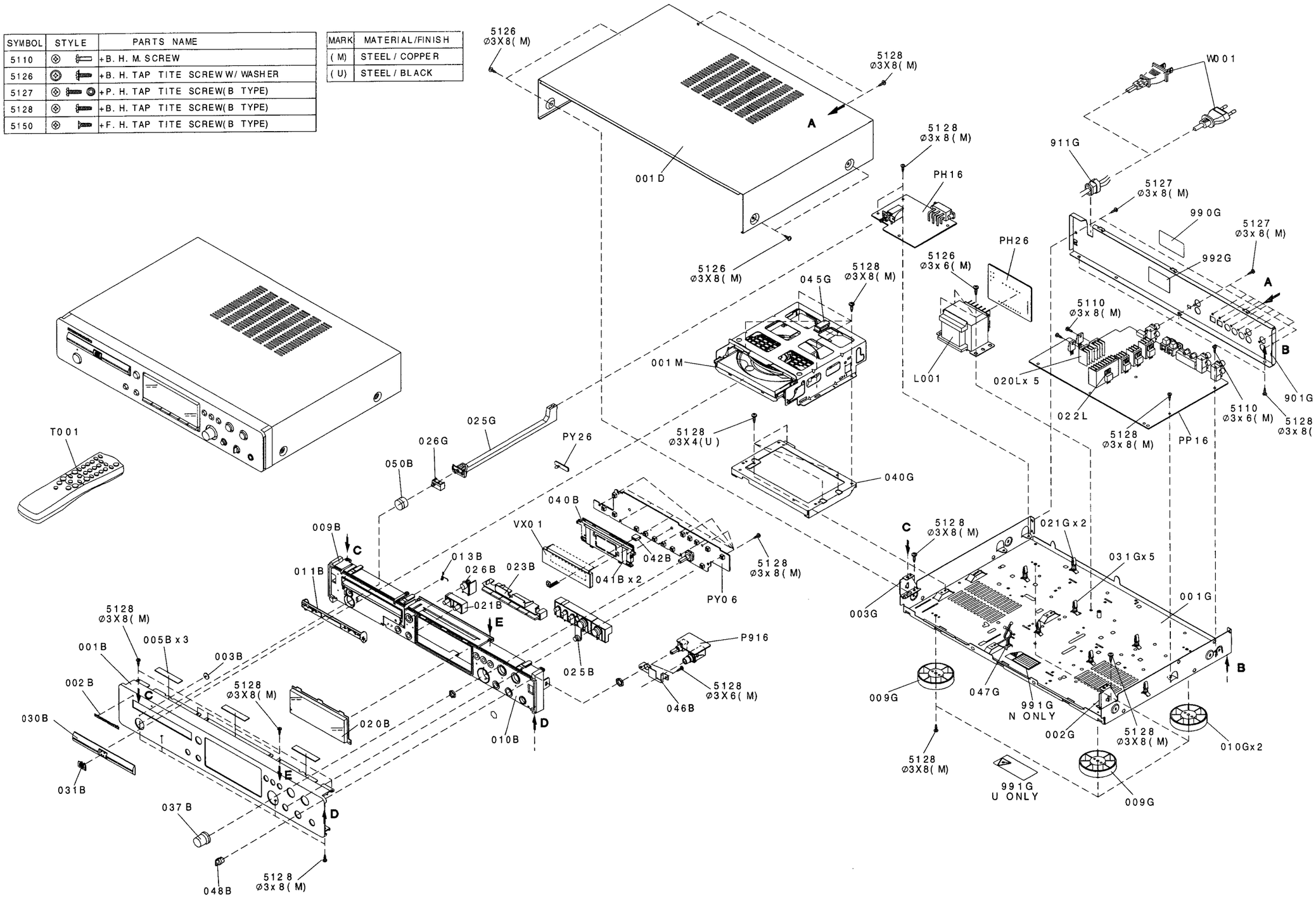
PH26



11. EXPLODED VIEW AND PARTS LIST

SYMBOL	STYLE	PARTS NAME
5110		+B. H. M. SCREW
5126		+B. H. TAP TITE SCREW W/ WASHER
5127		+P. H. TAP TITE SCREW(B TYPE)
5128		+B. H. TAP TITE SCREW(B TYPE)
5150		+F. H. TAP TITE SCREW(B TYPE)

MARK	MATERIAL/FINISH
(M)	STEEL / COPPER
(U)	STEEL / BLACK



POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
001B	GOLD	9965 000 05936	FRONT PANEL GL	385K248110
001B	BLACK	9965 000 05923	FRONT PANEL BL	385K248010
002B		4822 454 11825	MARANTZ BADGE	185J251010
003B		9965 000 01393	STANDBY LED LENS	312J355010
009B	GOLD	9965 000 05017	FRONT CHASSIS RIGHT GL	383K105120
009B	BLACK	9965 000 05016	FRONT CHASSIS RIGHT BL	383K105020
010B	GOLD	9965 000 05937	FRONT CHASSIS LEFT GL	385K105110
010B	BLACK	9965 000 05924	FRONT CHASSIS LEFT BL	385K105010
011B		9965 000 05925	TRAY LID ARM	386K257020
013B		9965 000 05926	SPRING TRAY LID LEFT	386K115020
020B		9965 000 05927	WINDOW PINK SMOKE	383K158020
021B	GOLD	9965 000 05938	BUTTON DISPLAY/SCROLL GL	385K270110
021B	BLACK	9965 000 05928	BUTTON DISPLAY/SCROLL BL	385K270010
023B		9965 000 05025	BUTTON SOURCE/ETC.BL	386K270090
025B	GOLD	9965 000 05939	BUTTON REC/PLAY/STOP GL	383K270130
025B	BLACK	9965 000 05929	BUTTON REC/PLAY/STOP BL	383K270030
026B	GOLD	9965 000 05023	BUTTON OPEN/CLOSE GL	383K270120
026B	BLACK	9965 000 05022	BUTTON OPEN/CLOSE BL	383K270020
030B	GOLD	9965 000 05940	ESCUTCHEON TRAY LID OUTER GL	386K063110
030B	BLACK	9965 000 05930	ESCUTCHEON TRAY LID OUTER BL	386K063010
031B	GOLD	9965 000 05941	BADGE CD-RW GL	386K251110
031B	BLACK	9965 000 05931	BADGE CD-RW BL	386K251010
037B	GOLD	9965 000 05942	JOG KNOB GL	386K154110
037B	BLACK	9965 000 05932	JOG KNOB BL	386K154010
048B	GOLD	9965 000 00580	KNOB	284T154240
048B	BLACK	4822 411 20336	HEADPHONE VOLUME GL KNOB HEADPHONE VOLUME BL	284T154310
050B	GOLD	9965 000 01395	BUTTON POWER GL	255W270110
050B	BLACK	9965 000 01975	BUTTON POWER BL	255W270010
009G		4822 462 42129	LEG FRONT	183J057010
010G		4822 462 42048	LEG REAR	183J057110
025G		9965 000 00362	LINK POWER SWITCH	349K121010
026G		9965 000 05933	LINK EXTENSION	386K121010
911G	/F		MAINS CORD BUSH	085J259010
911G	/K, /N, /U	4822 532 60948	MAINS CORD BUSH	450H259010
⚠ W001	/F		MAINS CORD F OR E	YC01800800
⚠ W001	/K		MAINS CORD CCEE APP. AC250V 10A VAR1P	YC01800880
⚠ W001	/N	4822 321 11343	MAINS CORD N	YC01800790
⚠ W001	/U		MAINS CORD UL/CSA NON-INTEGRAL	YC02000880
WF01		9965 000 05935	FFC CABLE 30P 0.5MM	*YU000640R
			PACKING	
001T	/F		USER GUIDE	385K851110
001T	/K		USER GUIDE	385K851350
001T	/N	9965 000 05934	USER GUIDE	385K851310
001T	/U		USER GUIDE	385K851250
T001		9965 000 05922	REMOTE COMMANDER RC6050DR	ZK386K0010
			NOT STANDARD SPEAR PARTS	
001S			PACKING CASE	385K801010
002S			CUSHION	386K809010
J081	/K		JACK MAINS ADAPTER	YJ04001240
W002			RCA ST.CORD 1M GL	ZD01000550
W003	/F		OPTICAL FIBER CABLE P2187-60A	ZD00600080
W003	/K, /N, /U		RCA CORD 1M BLACK	ZD01000520
W004			RCA CORD ST.CORD 1M GL	ZD01000550
W005			RCA CORD RC-5 CODE 0.9M	ZD00900100

12. ELECTRICAL PARTS LIST

ASSIGNMENT OF COMMON PARTS CODES.

RESISTORS

R***: 1) GD05 × × × 140, Carbon film fixed resistor, ±5% 1/4W
R***: 2) GD05 × × × 160, Carbon film fixed resistor, ±5% 1/6W
① —— Resistance value

Examples ;
① Resistance value

0.1 Ω 001	10 Ω 100	1 kΩ 102	100 kΩ 104
0.5 Ω 005	18 Ω 180	2.7 kΩ 272	680 kΩ 684
1 Ω 010	100 Ω 101	10 kΩ 103	1 MΩ 105
6.8 Ω 068	390 Ω 391	22 kΩ 223	4.7 MΩ 475

Note : Please distinguish 1/4W from 1/6W by the shape of parts used actually.

CAPACITORS

C***: CERAMIC CAP.
3) DD1 × × × × 370, Ceramic capacitor
② ③ Disc type
Temp.coeff.P350 ~N1000, 50V
③ —— Capacity value
② —— Tolerance

Examples ;
② Tolerance (Capacity deviation)
±0.25 pF 0
±0.5 pF 1
±5% 5
* Tolerance of COMMON PARTS handled here are as follows :
0.5 pF ~ 5 pF .... ±0.25 pF
6 pF ~ 10 pF .... ±0.5 pF
12 pF ~ 560 pF .... ±5%
③ Capacity value

0.5 pF 005	3 pF 030	100 pF 101
1 pF 010	10 pF 100	220 pF 221
1.5 pF 015	47 pF 470	560 pF 561

C*** : CERAMIC CAP.
4) DK16 × × × 300, High dielectric constant ceramic capacitor
④ Disc type
Temp.chara. 2B4, 50V
④ —— Capacity value

Examples ;
④ Capacity value

100 pF 101	1000 pF 102	10000 pF 103
470 pF 471	2200 pF 222	

C*** : 5) ELECTROLY CAP. (⏚), 6) FILM CAP. (⏤)
5) EA × × × × × × 10, Electrolytic capacitor
⑤ ⑥ One-way lead type, Tolerance ±20%
⑥ —— Working voltage
⑤ —— Capacity value

Examples ;
⑤ Capacity value

0.1 μF 104	4.7 μF 475	100 μF 107
0.33 μF 334	10 μF 106	330 μF 337
1 μF 105	22 μF 226	1100 μF 118
		2200 μF 228

⑥ Working voltage

6.3V 006	25V 025
10V 010	35V 035
16V 016	50V 050

6) DF15 × × × 350 ┐ Plastic film capacitor
DF15 × × × 310 ┘ One-way type, Mylar ±5% 50V
DF16 × × × 310 —— Plastic film capacitor
One-way type, Mylar ±10% 50V
⑦ —— Capacity value

Examples ;
⑦ Capacity value

0.001 μF (1000 pF) 102	0.1 μF 104
0.0018 μF 182	0.56 μF 564
0.01 μF 103	1 μF 105
0.015 μF 153	

NOTE : 1) The above CODES (R***, R***, C***, C*** and C ***) are omitted on the schematic diagram in some case.
2) On the occasion, be confirmed the common parts on the parts list.
3) Refer to "Common Parts List" for the other common parts (**RI05, DD4, DK4**).

NOTE ON SAFETY FOR FUSIBLE RESISTOR :

The suppliers and their type numbers of fusible resistors are as follows;
1. KOA Corporation

Part No. (MJI)	Type No. (KOA)	Description
NH05 × × × 140	RF25S × × × × ΩJ	(±5% 1/4W)
NH05 × × × 120	RF50S × × × × ΩJ	(±5% 1/2W)
NH85 × × × 110	RF73B2A × × × × ΩJ	(±5% 1/10W)
NH95 × × × 140	RF73B2E × × × × ΩJ	(±5% 1/4W)

* Resistance value — Resistance value (0.1 Ω – 10 kΩ)

2. Matsushita Electronic Components Co., Ltd

Part No. (MJI)	Type No. (MEC)	Description
NF05 × × × 140	ERD-2FCJ × × ×	(±5% 1/4W)
RF05 × × × 140		
NF02 × × × 140	ERD-2FCG × × ×	(±2% 1/4W)
RF02 × × × 140		

* Resistance value — * Resistance value

Examples ;
* Resistance value

0.1 Ω 001	10 Ω 100	1 kΩ 102	100 kΩ 104
0.5 Ω 005	18 Ω 180	2.7 kΩ 272	680 kΩ 684
1 Ω 010	100 Ω 101	10 kΩ 103	1 MΩ 105
6.8 Ω 068	390 Ω 391	22 kΩ 223	4.7 MΩ 475

ABBREVIATION AND MARKS

ANT.	: ANTENNA	BATT.	: BATTERY
CAP.	: CAPACITOR	CER.	: CERAMIC
CONN.	: CONNECTING	DIG.	: DIGITAL
HP	: HEADPHONE	MIC.	: MICROPHONE
μ-PRO	: MICROPROCESSOR	REC.	: RECORDING
RES.	: RESISTOR	SPK	: SPEAKER
SW	: SWITCH	TRANSF.	: TRANSFORMER
TRIM.	: TRIMMING	TRS.	: TRAMSISTOR
VAR.	: VARIABLE	X'TAL	: CRYSTAL

NOTE ON SAFETY :

Symbol ⚠ Fire or electrical shock hazard. Only original parts should be used to replaced any part marked with symbol ⚠ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

安全上の注意 :

⚠がついている部品は、安全上重要な部品です。必ず指定されている部品番号の部品を使用して下さい。

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			P916-HEAD PHONE CIRCUIT BOARD	
			P916-CAPACITORS	
C901				
⟆		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C904				
C905		4822 124 90354	ELECT. 100µF M 16V RA-2	OA10701620
C906		4822 124 90354	ELECT. 100µF M 16V RA-2	OA10701620
			P916-RESISTORS	
R901		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
R902		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
R903		4822 051 30273	CHIP 27kΩ ±5% 1/16W	NN05273610
R904		4822 051 30273	CHIP 27kΩ ±5% 1/16W	NN05273610
R905		4822 051 30123	CHIP 12kΩ ±5% 1/16W	NN05123610
R906		4822 051 30123	CHIP 12kΩ -+5% 1/16W	NN05123610
R907		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
R908		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
R909				
⟆		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R912				
R913				
⟆		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
R916				
R917		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
R920		9965 000 00602	VAR. 10kΩ B D-CUT	RM01031170
			P916-SEMICONDUCTORS	
Q901		4822 209 31378	IC NJM4556MB	HC10045090
Q903		4822 130 43818	TRS. 2SC2878 A OR BRANK	HT328782A0
Q904		4822 130 43818	TRS. 2SC2878 A OR BRANK	HT328782A0
			P916-MISCELLANEOUS	
J901		9965 000 01662	H.P JACK HLJ0540-01-410 BL	YJ01003870
L901		4822 157 10416	EMI FILTER BLM11B102S 1608	FN31010030
L902		4822 157 10416	EMI FILTER BLM11B102S 1608	FN31010030
			PH16-POWER SW. CIRCUIT BOARD	
			PH16-CAPACITORS	
C907		5322 126 11578	CER. CHIP 1000pF ±10% B 50V	DK96102300
C908		5322 126 11578	CER. CHIP 1000pF ±10% B 50V	DK96102300
C910		4822 122 40617	CER. 0.1µF 50V +80 -20%	DD38104010
⚠ CH05		4822 122 33276	CER. DE7150 F 103M	DK17103840
			PH16-MISCELLANEOUS	
⚠ F820	/F		FUSE 1A 250V UL/CSA	FS10100350
⚠ F820	/K, /N	4822 070 31002	FUSE 1A 250V BS LISTED	FS10100850
⚠ F820	/U		FUSE 1A 250V UL/CSA	FS10100350
GH05		4822 122 33276	CER. DE7150 F 103M	DK17103840
⚠ L001	/F		MAINS TRANSF. 100V 50/60HZ F	TS15749010
⚠ L001	/K		MAINS TRANSF. 220/110V K	TS15749030
⚠ L001	/N	9965 000 05920	MAINS TRANSF. 230V50/60HZ N/K	TS15749020
⚠ L001	/U		MAINS TRANSF. 120V 60HZ U/C	TS15749040
⚠ LH01		9965 000 00394	HR-24R-E273 27MH 0.6A	FN01010070
⚠ SH01		9965 000 05921	PUSH SWITCH ESB92S94B TV-5 1.5MM	SP01012480
SH02	/K		SLIDE SWITCH SDKGA4 SEMKO	SS02021510
			PP16-MAIN CIRCUIT BOARD	
			PP16-CAPACITORS	
C301		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C311		4822 122 10172	CER. CHIP 220pF ±10% B 50V	DK96221300
C312		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
C313		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
C314		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
C601			FILM 0.0033µF J M 50V	DF15332350
C602			FILM 0.0033µF J M 50V	DF15332350
C603				
⟆			FILM 0.001µF J M 50V	DF15102350
C606				
C629				
⟆		4822 124 80119	ELECT. 100µF 16V ARA	OA10702540
C632				
C651		4822 122 10172	CER. CHIP 220pF ±10% B 50V	DK96221300
C652		4822 122 10172	CER. CHIP 220pF ±10% B 50V	DK96221300
C654		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C655				
⟆		4822 124 90365	ELECT. 220µF M 25V RA-2	OA22702520
C658				
C701		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C702		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C703		5322 124 21731	ELECT. 10µF M 50V RA-2	OA10605020
C704		5322 124 21731	ELECT. 10µF M 50V RA-2	OA10605020
C705		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
C706		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
C707		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C708		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C709		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C710		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
C711				
⟆		4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620
C714				
C715			FILM 0.0015µF J M 50V	DF15152350
C716			FILM 0.0015µF J M 50V	DF15152350
C717		4822 122 10172	CER. CHIP 220pF ±10% B 50V	DK96221300
C718		4822 122 10172	CER. CHIP 220pF ±10% B 50V	DK96221300
C719		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C720		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
C721		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C722		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
C723		4822 124 80067	ELECT. 4.7µF M 50V RA-2	OA47505020
C724		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
C725		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
C726		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
C727		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C728		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C729		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
C730		4822 126 11687	CER. CHIP 0.1µF	DK98104200
C731		4822 122 40617	CER. 50V DC 0.1µF +80% -20%	DD38104010
C803		9965 000 05917	ELECT. 1000µF 35V SILMIC	OA10803540
C804		9965 000 05917	ELECT. 1000µF 35V SILMIC	OA10803540
C807		4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620
C808		4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620
C809		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C810		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C811		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C812		4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620
C813		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C815		4822 124 90354	ELECT. 100µF 16V RA-2	OA10701620
C816		4822 124 90354	ELECT. 100µF 16V RA-2	OA10701620
C817		4822 124 22703	ELECT. 0.22µF M 50V RA-2	OA22405020
C818		4822 124 22703	ELECT. 0.22µF M 50V RA-2	OA22405020
C819		4822 124 22703	ELECT. 0.22µF M 50V RA-2	OA22405020
C821		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C822		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C823		4822 124 90356	ELECT. 1000µF M 35V RA-2	OA10803520
C824		4822 124 11583	ELECT. 2200µF 35V RA-2	OA22803520
C825		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C826		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C827		4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620
C828		4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620
C829		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C830		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C841		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
C842		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C843		4822 124 12328	ELECT. 6800µF 16V RA2 TYPE	OA68801620
C844		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C845		4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620
C846		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
C847		4822 124 12328	ELECT. 6800µF 16V RA2	OA68801620
C851		4822 124 81133	ELECT. 4700µF 25V RA-2	OA47802520
CD01		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
CD02		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
CD03		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CD04		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CD05		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
CD06		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
CD07				
⟆		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CD10				
CD11		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
CD12		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
CD13		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CD14		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CD15		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
CD16		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
CD18				
⟆			FILM 0.001µF J M 50V	DF15102350
CD21				
CD23				
⟆		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CD26				
CD51		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CD52		4822 124 41796	ELECT. 22µF M 16V RA-2	OA22601620
CD53		4822 124 41543	ELECT. 1µF 50V RA-2	OA10505020
CD54		4822 124 41796	ELECT. 22µF M 16V RA-2	OA22601620
CF51		4822 126 11568	CER. CHIP 470pF GR39	DK96471300
CF52		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CH01		4822 126 13842	CER. 33PF	DA15330110
CH02		4822 126 13842	CER. 33PF	DA15330110
CH11				
⟆		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
CH14				
CN01		4822 124 22273	ELECT. 4.7µF 50V RA-2	OA47405020
CN02		4822 124 40763	ELECT. 2.2µF M 50V RA-2	OA22505020
CN03		4822 124 22723	ELECT. 1000µF M 25V RA-2	OA10802520
CN04		4822 124 41539	ELECT. 47µF 16V RA-2	OA47601620
CT01		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CT03		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
CT04		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CY61		4822 124 90355	ELECT. 100µF M 50V RA-2	OA10705020
CY62		4822 124 90355	ELECT. 100µF M 50V RA-2	OA10705020
CY65		4822 124 90355	ELECT. 100µF M 50V RA-2	OA10705020
CY67		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
CY71		4822 124 40723	ELECT. 2200µF 16V	OA22801620
CY72		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
CY73		4822 122 40617	CER. 0.1µF +80%-20% 50V DC	DD38104010
			PP16-RESISTORS	
R301		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
R311		4822 051 30759	CHIP 75Ω ±5% 1/16W	NN05750610
R312		4822 051 30332	CHIP 3.3kΩ ±5% 1/16W	NN05332610
R313		4822 051 30332	CHIP 3.3kΩ ±5% 1/16W	NN05332610
R314		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
R601				
⟆		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
R604				
R605		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
R606		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
R607		4822 051 30152	CHIP 1.5kΩ ±5% 1/16W	NN05152610
R608		4822 051 30152	CHIP 1.5kΩ ±5% 1/16W	NN05152610
R609		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
R610		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
R611		4822 051 30152	CHIP 1.5kΩ ±5% 1/16W	NN05152610
R612		4822 051 30152	CHIP 1.5kΩ ±5% 1/16W	NN05152610
R651				
⟆		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R654				
R655		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
R656		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
R701				
⟆		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
R704				
R705				
⟆		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
R708				
R709		4822 117 12902	CHIP 8.2kΩ ±5% 1/16W	NN05822610
R710		4822 117 12902	CHIP 8.2kΩ ±5% 1/16W	NN05822610
R711				
⟆		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
R716				
R717				
⟆		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
R720				
R721		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
R722		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
R723		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
R724		4822 157 10416	EMI FILTER BLM11B102S 1608	FN31010030
R725		4822 116 60295	FUSIBLE 47Ω ±5% 1/4W	NH05470140
R726		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
R727		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R728		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R729		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
R730		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
R801		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
R802		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
R803				
⟆		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
R806				
R807		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
R808		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
R809		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
R810		4822 117 12925	CHIP 40kΩ ±5% 1/16W	NN05473610
R811		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
R812		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
R813		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
R814		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
R815		4822 051 30101	CHIP 1000Ω ±5% 1/16W	NN05101610
R816		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
R817		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
R818		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
R819		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
R820		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
R821		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
R841		4822 051 30223	CHIP 22kΩ ±5% 1/6W	NN05223610
RD01				
⟆		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
RD05				
RD06		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
RD07				
⟆		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD11				
RD50				
⟆		4822 157 10416	EMI FILTER BLM11B102S 1608	FN31010030
RD55				
RD56				
⟆		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RD67				
RD68		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD69		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
RD70		4822 157 10416	EMI FILTER BLM118102S 1608	FN31010030
RD73		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RF51		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RF52		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RF53		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RF54		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RF55		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
RF56		4822 117 12139	CHIP 22Ω ±5% 1/16W	NN05220610
RF57		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RH01				
⟆		4822 116 90503	CHIP 150Ω ±5% 1/10W	NI05151110
RH04				
RH05		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
RH06		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
RH07		4822 117 11953	CHIP 560Ω ±5% 1/10W	NI05561110
RH08		4822 117 11953	CHIP 560Ω ±5% 1/10W	NI05561110
RH09		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
RH10		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
RH11		4822 117 11953	CHIP 560Ω ±5% 1/10W	NI05561110
RH12		4822 117 11953	CHIP 560Ω ±5% 1/10W	NI05561110
RH15		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
RH16		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
RH17			RESISTOR 100Ω ±5% 1/6W	GD05101160
RH18			RESISTOR 100Ω ±5% 1/6W	GD05101160
RH19				
⟆			RESISTOR 33Ω ±5% 1/6W	GD05330160
RH22				
RH23		4822 052 10109	RESISTOR 10Ω ±5% 1/4W	GG05100140
RH24		4822 052 10109	RESISTOR 10Ω ±5% 1/4W	GG05100140
RH25		4822 051 20333	CHIP 33kΩ ±5% 1/10W	NI05333110
RH26		4822 051 20333	CHIP 33kΩ ±5% 1/10W	NI05333110
RN01		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RN02		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
RN03		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RN04		4822 051 30154	CHIP 150kΩ ±5% 1/16W	NN05154610
RN05		4822 051 30392	CHIP 3.9kΩ ±5% 1/16W	NN05392610
RN06		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RN07		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
RN08		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RN09		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RN10		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RN11		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RN51				
⟆		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
RN54				
RT01		4822 051 30339	CHIP 33Ω ±5% 1/16W	NN05330610
RT02		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RT03		4822 051 30759	CHIP 75Ω ±5% 1/16W	NN05750610
RY28		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RY29		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY30		4822 116 90503	CHIP 150Ω ±5% 1/10W	NI05151110
			PP16-SEMICONDUCTORS	
D701				
⟆		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D704				
D705		4822 130 32362	DIODE 1SS176.MA165 1SS254 30V 0.1A	HD20002000
D709		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D710		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
⚠ D801				
⟆		4822 130 82421	DIODE 1D3 1A 200V	HD20002710
⚠ D804				
D811		4822 130 80272	ZENER DIODE 7.5V	HD30751000
D812		4822 130 80272	ZENER DIODE 7.5V	HD30751000
D813		4822 130 33948	ZENER DIODE 5.6V	HD30561000
⚠ D821				
⟆		4822 130 82421	DIODE 1D3 1A 200V	HD20002710
⚠ D824				

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
⚠ D841				
⟆		4822 130 32968	DIODE RL203-M11 2A-200V	HD20001710
⚠ D844				
⚠ D850		4822 130 82421	DIODE 1D3 1A 200V	HD20002710
⚠ D851		4822 130 82421	DIODE 1D3 1A 200V	HD20002710
⚠ D852		4822 130 82421	DIODE 1D3 1A 200V	HD20002710
DD50		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
DD51		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DF51		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DH01		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DH02		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DH05		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DH06		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DH09		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DH10		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DN01				
⟆		4822 130 82421	DIODE 1D3 1A 200V	HD20002710
DN04				
DN05		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DN06		4822 130 33948	ZENER DIODE 5.6V	HD30561000
DN07		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DN08		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DY62		4822 130 82421	DIODE 1D3 1A 200V	HD20002710
DY63		4822 130 82421	DIODE 1D3 1A 200V	HD20002710
DY71				
⟆		4822 130 82421	DIODE 1D3 1A 200V	HD20002710
DY74				
Q311		4822 209 31568	IC 74HCU04	HC700400Z0
Q601		4822 209 91175	IC NJM2114M	HC10175090
Q602		4822 209 91175	IC NJM2114M	HC10175090
Q701		4822 209 17155	IC NJM2068M	HC10102090
Q702		9965 000 05884	IC ELE.VOLUME	HC10100990
Q703		9965 000 05885	IC AK535/VF 20BIT A/D CONVERTER	HC10023480
Q705		9965 000 05910	IC NJM2082M	HC10103090
Q706		9965 000 05910	IC NJM2082M	HC10103090
⚠ Q801		4822 130 62549	TRS. 2SD1762 E F	HT417622B0
⚠ Q802		4822 130 62548	TRS. 2SB1185 E.F	HT211852B0
⚠ Q803		4822 209 73096	IC NJM78M05FA	HC38505090
Q804		4822 130 61311	CHIP TRS. 2SA1162 O.Y	HC111622A0
Q805		4822 130 61355	CHIP TRS. 2AC2712 O.Y	HC327122A0
Q806		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HC327122A0
Q810		4822 209 71451	IC NJM4558M Y	HC10011090
⚠ Q821		4822 209 62943	IC NJM79M08FA	HC39508090
⚠ Q822		4822 209 70084	IC NJM7812FA +12V	HC38912090
⚠ Q841		4822 209 17381	IC PQ05RD21 5V 2A	HC31905320
⚠ Q851		4822 209 80655	IC NJM78M08FA +8V 0.5A	HC38508090
Q905		4822 130 43818	TRS. 2SC2878 A OR BRANK	HT328782A0
Q906		4822 130 43818	TRS. 2SC2878 A OR BRANK	HT328782A0
QD01		4822 209 90978	IC TDA1305T DMAINS	HC10122490
QD02		4822 209 90978	IC TDA1305T DMAINS	HC10122490
QD03		4822 209 17526	IC IC TC160G11AU-1305	HC10438050
QD50		9965 000 05912	IC 74HCT244AF -	HC724400Q0
QD51		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HC327122A0
QD52		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HC327122A0
QD56		4822 130 61311	CHIP TRS. 2SA1162 O.Y	HC111622A0
QD57		4822 130 61311	CHIP TRS. 2SA1162 O Y	HC111622A0
QF51		4822 130 61311	CHIP TRS. 2SA1162 O.Y	HC111622A0
QF52		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HC327122A0
QH01				
⟆		4822 130 42839	F.E.T. 2SK369 BL VGDS-40V PD0.4W	HF203691B0
QH04				
QH05		4822 130 61425	CHIP TRS. 2SC2873 Y	HC328731B0
QH06		4822 130 61425	CHIP TRS. 2SC2873 Y	HC328731B0

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
QH07				
⟆		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
QH10				
QH11		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HX327122A0
QH12		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HX327122A0
QH13		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
QH14		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
QH15		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
QH16		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
QN01		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HX327122A0
QN02		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HX327122A0
QN03		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HX327122A0
QN04		4822 130 61311	CHIP TRS. 2SA1162 O.Y	HX111622A0
QN05		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HX327122A0
QN06		4822 130 61311	CHIP TRS. 2SA1162 O.Y	HX111622A0
QN51				
⟆		4822 130 43818	TRS. 2SC2878 A OR BRANK	HT328782A0
QN54				
QY05		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HX327122A0
			PP16-MISCELLANEOUS	
⚠ F802	/F,/U		FUSE 0.5A 125V UL/CSA	FS20050220
⚠ F802	/K, /N	4822 071 55001	FUSE 0.5A 250V SEMKO VDE	FS20050200
⚠ F804	/F,/U		FUSE 0.5A 150V UL/CSA	FS20050220
⚠ F804	/K, /N	4822 071 55001	FUSE 0.5A 250V SEMKO VDE	FS20050200
⚠ F821	/F,/U		FUSE 0.8A 125V UL/CSA	FS20080220
⚠ F821	/K, /N	9965 000 05918	FUSE 0.8A 250V SEMKO VDE	FS20080200
⚠ F823	/F,/U		FUSE 0.8A 125V UL/CSA	FS20080220
⚠ F823	/K, /N	9965 000 05918	FUSE 0.8A 250V SEMKO VDE	FS20080200
⚠ F841	/F,/U		FUSE 0.4A 125V UL/CSA	FS20040220
⚠ F841	/K, /N	9965 000 05919	FUSE 0.4A 250V SEMKO VDE	FS20040200
⚠ F843	/F,/U		FUSE 2.0A 125V UL/CSA	FS20200220
⚠ F843	/K, /N	4822 071 52002	FUSE 2.0A 250V SEMKO VDE	FS20200200
J301		4822 218 11487	OPTICAL RECIVER GP1F32R	YJ15000150
J311		4822 290 81638	TERMINAL 14X14 RA 1L1P	YT02010790
J651		4822 290 61216	TERMINAL 2P RCA W/R GOLD	YT02020950
J701		4822 290 61216	TERMINAL 2P RCA W/R GOLD	YT02020950
JF51		4822 267 41009	TERMINAL 2P RCA PIN JACK	YT02020890
JJ01		9965 000 05911	FFC CONNECTER 30P 0.5MM	YJ07021230
JT01		4822 290 81638	TERMINAL 14X14 RA 1L1P	YT02010790
JT02		4822 267 31369	OPTICAL OUTPUT GP1F32T	YJ15000090
L311		4822 157 10416	EMI FILTER BLM11B 102S 1608	FN31010030
L651		4822 157 10416	EMI FILTER BLM11B 102S 1608	FN31010030
L652		4822 157 10416	EMI FILTER BLM11B 102S 1608	FN31010030
L701		4822 157 10416	EMI FILTER BLM11B 102S 1608	FN31010030
L702		4822 157 10416	EMI FILTER BLM11B 102S 1608	FN31010030
LF51		4822 157 10416	EMI FILTER BLM11B 102S 1608	FN31010030
LT01		4822 157 10416	EMI FILTER BLM11B 102S 1608	FN31010030
LT02		4822 142 60422	PULSE TRANSF. TPS247MN-0386AN	TP41042030
SF51		4822 277 21559	SLIDE SWITCH INT/EXT	SS02021150
			PY16-FRONT CIRCUIT BOARD	
			PY16-CAPACITORS	
CY03		5322 122 32654	CER. CHIP 0.022µF ±10% XTR	DK96223200
CY04		9965 000 05913	CER. CHIP 22pF ±2% 50V	DD942203A0
CY05		9965 000 05913	CER. CHIP 22pF ±2% 50V	DD942203A0
CY06		4822 126 11687	CER. CHIP 0.1µF +80%-20%	DK98104200
CY07		4822 124 21901	ELECT. 47µF 6.3V	EJ47600610
CY09		4822 122 31765	CER. CHIP 100pF ±5% CG 50V	DD95101300

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
CY10		4822 122 31765	CER. CHIP 00pF ±5% CG 50V	DD95101300
CY11		4822 126 11687	CER. CHIP 0.1µF	DK98104200
CY12		4822 126 11704	CER. CHIP 0.022µF 50V	DK98223300
CY13		4822 124 21901	ELECT. 47µF 6.3V	EJ47600610
			PY16-RESISTORS	
RY01		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RY02		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RY03		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RY04		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RY05		4822 051 30393	CHIP 39kΩ ±5% 1/16W	NN05393610
RY06		4822 051 30471	CHIP 470Ω ±5% 1/16W	NN05471610
RY09		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RY10		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RY11		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RY12		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY13		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY14		4822 051 30153	CHIP 15kΩ ±5% 1/16W	NN05153610
RY15		4822 051 30153	CHIP 15kΩ ±5% 1/16W	NN05153610
RY21				
⟆		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RY26				
RY27		4822 117 12925	CHIP 47kΩM ±5% 1/16W	NN05473610
			PY16-SEMICONDUCTORS	
DY04		5322 130 31504	ZENER DIODE MTZ J 3.3A	HD30331000
QY01			IC TMP87PM74ZF OTP U-COM	HC60015050
QY02		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HX327122A0
QY03		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HX327122A0
QY04		4822 130 61355	CHIP TRS. 2SC2712 O.Y	HX327122A0
			PY16-MISCELLANEOUS	
SY01				
⟆		9965 000 00373	TACT SW MATU EVQ11L05R	SP01013370
SY08				
SY12		9965 000 00373	TACT SW MATU EVQ11L05R	SP01013370
SY13		9965 000 00373	TACT SW MATU EVQ11L05R	SP01013370
SY17		9965 000 00373	TACT SW MATU EVQ11L05R	SP01013370
SY18		9965 000 00373	TACT SW MATU EVQ11L05R	SP01013370
SY22		9965 000 00373	TACT SW MATU EVQ11L05R	SP01013370
SY23		9965 000 00373	TACT SW MATU EVQ1105R	SP01013370
SY26		9965 000 05915	ROTARY SWITCH EC11B ROT ENCODER WITH PUSH SW	SR03030000
VX01		9965 000 05916	DISPLAY UNIT FTD BJ727GNK 15GRID X 22ANODE	HQ31208410
XY01		4822 242 72066	SERAMIC VIB. 8.0MHz CST8.0MHZ MT	FQ08004010
ZY01		4822 130 11494	PHOTO UNIT RPM6936-V4 IR SENSOR	HW10004210
			PY26-STAND BY CIRCUIT BOARD	
DY01		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320